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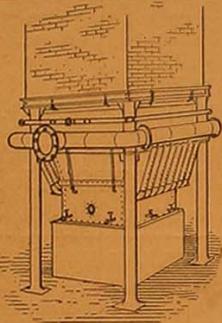
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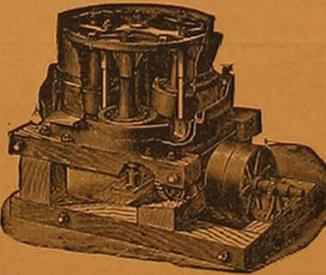
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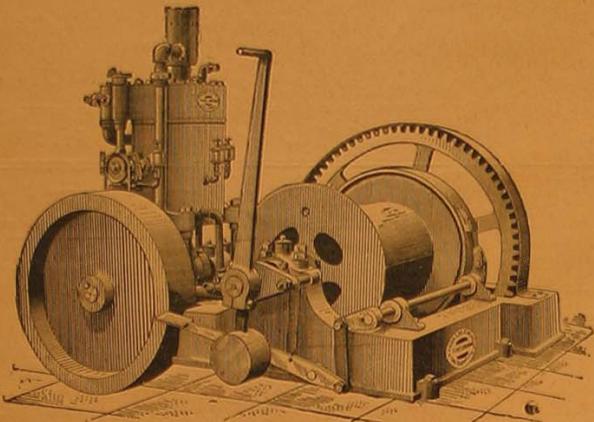
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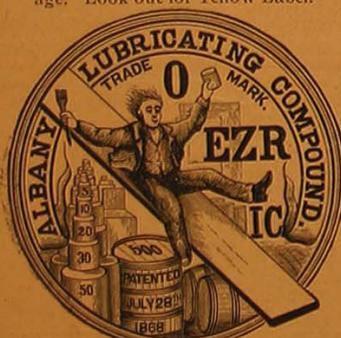
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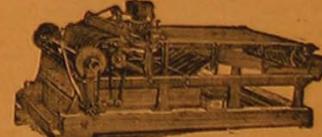
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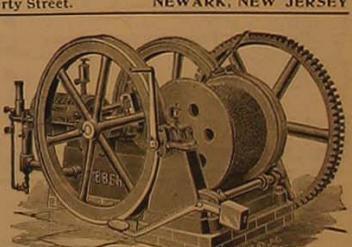
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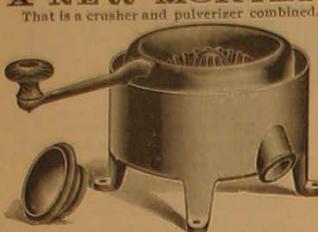


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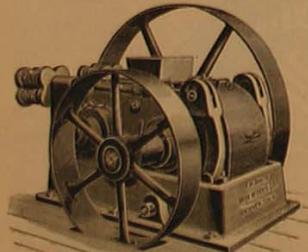
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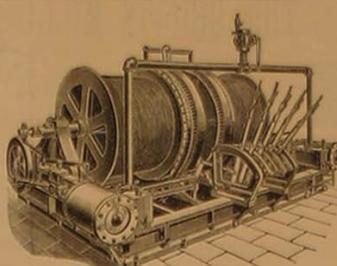
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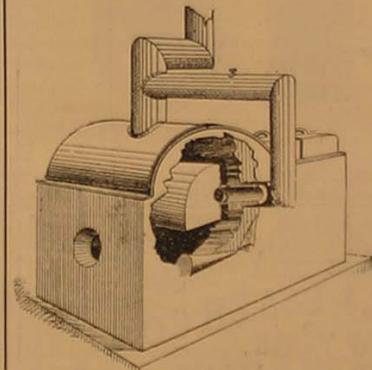
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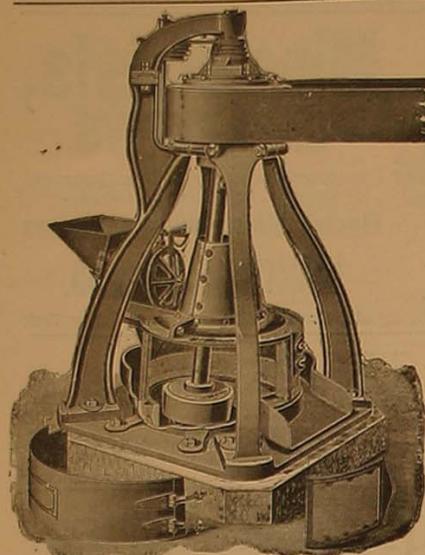
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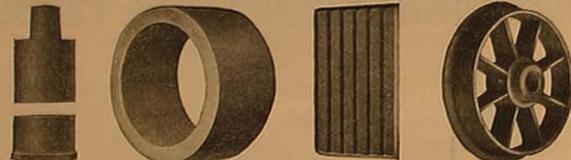
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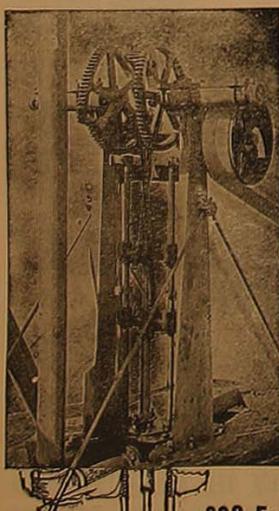
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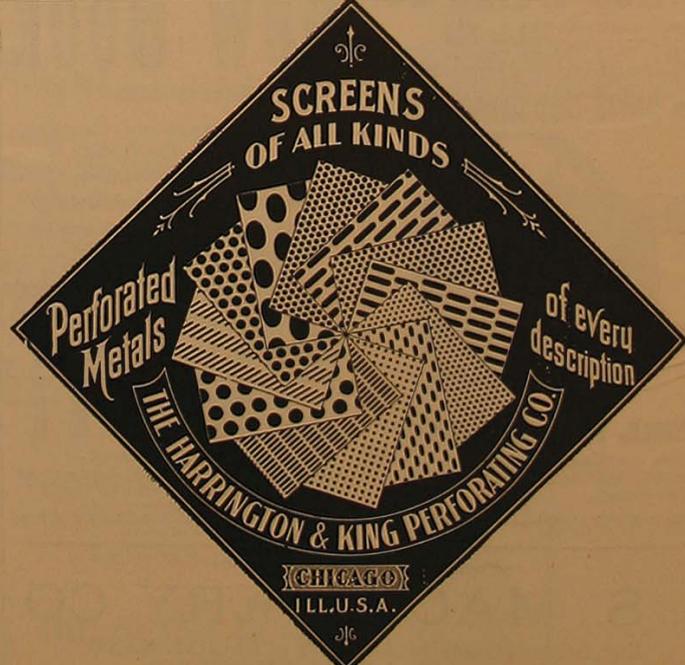


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ADVERTISING RATES FURNISHED ON APPLICATION.

PATENTING AN INVENTION.

In our last issue, reference was made to the delay and loss occasioned to inventors by the slow way in which the Patent Office examined applications for patents to new inventions. It will be interesting to inventors to learn that the Congressional bill, past 6th June last, for the revision and classification of letters patent. The operation of the bill will cause an expenditure of \$300,000; but, as this branch of the service is self-supporting, as the receipts are in excess of the expenses, the bill was necessary to get an increase of the staff of examiners and for revision and perfect classification, and give dispatch to the work of passing on new applications for a patent. This measure will meet with hearty approval from all inventors who are now caused to suffer loss on account of the tardy manner of examining new applications in the past.

IRON AND THE DIPPING NEEDLE.

Almost all magnetic iron ore deposits are natural magnets or dipping needles, held in place by the inclosing wall rocks.

The magnetic phenomenon witnessed by using a dipping needle in the hand of the operator over the apex or outcrop of a deposit of magnetic iron ore is extremely interesting, and to the inexperienced is rather perplexing. At the northern end of the deposit, the needle dips vertical, or say 90 degrees \pm , or north end of the needle, and generally decreases from the center line of the deposit on each side of that line by degrees, as the center line is departed from. In the same manner, at the south end of the deposit of magnetic iron ore, the dipping needle will generally dip vertical, or say 90 degrees \pm south end of the needle, along the center line of the deposit, and the strength of the attraction will decrease as that line is departed from towards either side. Between the negative and positive points of magnetic attraction, there is a center area or pivot of no attraction, where the dipping needle vibrates horizontally, and at places points in any direction, when moved slightly one way or the other. That point is the center of the deposit of ore, and corresponds to the pivot of the dip needle. The following in this connection, from the *Mining and Scientific Press*, is interesting reading:

"A LOCAL magnetic pole—a point where a 'dipping needle stands vertical—is reported by Prof. Leist to exist at Kotchetovka, in

"the Russian province of Kursk. It is necessary to move twenty yards from this spot to change the direction of the needle one degree. At the point of this interesting anomaly, the ordinary compass needle 'swings freely, stopping indifferently in any direction.'

The learned professor was not apparently acquainted with the use of the dipping needle, and did not know that he had discovered a body of magnetic iron ore, or, possibly, pyrrhotite, an ore of nickel and cobalt, or chrome iron ore, although there may not be a pound or piece of iron ore to be seen, being covered with surface soil, hence the value of the intelligent use of the dipping needle in tracing the extent of such deposits.

PROMOTING STOCK COMPANIES.

The organization of joint-stock companies has become a recognized occupation in both the United States and European countries. The extent to which such companies have increased have been productive of the encouragement of fraudulent operators. Their being no special law under which the fraudulent promoter could be restrained or prevented, the opportunity has been taken advantage of to its fullest extent in the European capitals, or centers where company promotion has reached the greatest development. The common occurrence of fraud in this connection, and to such an extent has this fraudulent means of obtaining capital under false pretences been carried on by unscrupulous promoters in France, that legislative action is about to be taken to stop or suppress the evil. M. Fleury-Ravarin, a deputy for the Rhone, has presented such a measure, which has received the unanimous approval of the Commission d'Initiative, with the recommendation of its discussion by the Chamber of Deputies. The difficult task of making people honest by act of the legislature has been forced upon the French Government, on account of the numerous frauds perpetrated on small investors, who do not as a rule take the precautions to make inquiry as to the resources and genuine character of the enterprise, as larger investors generally do. In future, it will be impossible to float a stock company without giving security and guaranty of the genuine nature of the enterprise. Every prospectus in future must give all details of the proposed company, and any false statements will cause the promoters to be held liable for heavy penalty. To prevent a promoter from absconding when threatened with expense and legal prosecution, it is compulsory that the enterprise must be recommended by a financial institution of more than two years' standing in France, and whose guaranty will secure the investor against loss from this cause. The banker, under these circumstances, becomes responsible for the new company, and will take care to make due inquiry in advance as to the genuine nature of the enterprise. The foregoing reasons apply equally well to this country, and make the necessity for a uniform Federal law to govern all limited or joint-stock companies a necessary measure.

A MINE OWNER'S DUTY.

The minerals of any country are one of the chief assets in the reserve account of the national resources. To preserve this source of the people's future wealth is a duty incumbent on each mine owner, by operating the

mine in a safe and permanent manner, so as to make the life time of the mine as long as possible. It is in this regard that the services of a mine inspector are considered necessary in most mining states and foreign countries, as well as in protecting the lives and interests of employees. Under individual ownership of mines, the matter of inspection is as necessary as under the Government ownership, as the mine owner, although vested in the fee simple to the minerals, has a duty to perform to posterity in operating the mine with due regard to deep mining. Workmen and leasees especially, when employed under contract to extract ore, require special supervision, to guard against the mine being left in an unsafe condition for future operation.

The common custom among mine owners, of operating their properties with regard to the present time only, has the effect of robbing the State of much mineral ground of future value. This is particularly true of the mining industry more than any other occupation, on account of the rapid advances which are being made each decade in the inventions and improvements in the manipulation of ores and in metallurgy. In the steady progress made in all branches of the industry, a lower grade of ore is being worked or made of value, hence the urgent necessity for operating mines with a due regard to future possibilities and safety. If the mine owners of the country, who ought to be most interested in the permanency of mining, do not leave sufficient supports to make their mines safe for future extraction of low grade ore left in the workings, then it is the duty of the mine inspector to interfere, or, if there is no inspector, it is high time that one was appointed, to care for the rights of the people and in the interests of deep mining and future development of the industry.

SOME RESULTS OF THE WAR.

The present war with Spain, although greatly to be regretted on account of the valuable American lives which have been already, and may yet be, sacrificed in the cause of liberty and humanity, in freeing the dependencies of Spain from oppression and misrule, has still a little good mingled with the evil. It has stimulated and increased iron and coal mining, created a demand for native sulphur in place of foreign importations, and advanced the market price of first quality graphite. These are some of the less important changes.

The new Revenue Bond Bill, which will increase our volume of money, by causing the silver bullion on hand, comprising seigniorage to the extent of \$42,000,000 to be coined, will relieve the Treasury of about \$20,000,000 a year. If the present Secretary, Gage, who is a believer in limited coinage and gold coin as the circulating medium, carries out the intention of the bill to the coinage capacity of the mints, it will still take considerable time to work off the large amount of silver bullion on hand. This measure will cause in time an increased demand for silver.

The acquisition of the Hawaiian Islands, Philippine Islands Ladrone Islands, Cuba, and, possibly, Porto Rico, will in the near future furnish a market for many million dollars of United States silver. This increased market for silver, with the introduction of better laws and a stable form of government in these islands, will have the desired effect of engraving American civilization and customs among the natives, and cause a greater

demand for silver coin among the inhabitants of these rich islands. As has found to be the case among the native population of India, these people will soon acquire the habit of hoarding silver coin, and furnish a demand equal to that of the poor classes of other countries. Freedom from the oppressive taxation of Spain will stimulate industry among these people and increase their purchasing power for silver coin. If the present war results in giving a needed market for the product of the silver mines of the Western States, the curse of the present war will have a silver lining.

THE MONEY ISSUE STILL PENDING.

One effect of the war will be to postpone final action on internal or domestic questions. For the time being at least, the tariff will be permitted to rest. It has been an issue for more than fifty years, and the people have become tired of the continual talk on that subject. Besides, every change affects values and disturbs business.

The most important question now before the people is that of a monetary system. As we have before said, our present system, if we have one at all, is complex and cumbrous, and it needs to be simplified and made definite. As it stands, it has really no defenders, and is tolerated because the new plans urged are radically different in theory, and there is not enough concordance on any line to bring about a definite result.

The line between the main forces is well enough defined, but there is a sufficient number holding modified views to impede the progress towards a final solution of the problem, or, in other words, to prevent for a time at least legislation that will be final and comprehensive.

On one side, the contention is that the gold standard should be made the basis or foundation of the system—that there shall be no other metal money except subsidiary silver coins, and that the superstructure shall be only paper circulation issued by the banks, which is to be redeemable only with gold.

On the other side, the contention is for a double standard represented by gold and silver coins of equal debt-paying power, bearing the relation of 1 of gold to 16 of silver, in accordance with the coinage laws that existed for eighty years prior to 1873, and a ratio recognized in the Bland-Allison Act of 1879, the Sherman Act of 1890, and the Revenue Act recently passed by Congress which requires \$18,000,000 to be coined annually from the silver bullion lying in the treasury, and that both gold and silver shall be coined freely and without limit. On this side it is maintained also that all paper money shall be issued by the government, and in sufficient volume to meet the demands of domestic trade, and made redeemable in gold and silver coins at the option of the government.

These are the well-defined and radically different plans, and thus far neither side has been able to rally strength enough to carry its plan, and the intermediaries have sufficient strength to probably prevent either plan from being adopted; at any rate, it will be a well-contested struggle, with the prospect that legislation in the end will be on some line in modification of the divergent theories.

On the one side it is maintained that our money system should correspond with that of the leading European nations, and that adaptation to foreign trade should be the controlling principle. On the other, it is argued that the system should be such as shall recognize the importance and needs of domestic

trade, which is more than fifteen times greater than our foreign, that if the home commerce is provided for adequately, foreign commerce will take care of itself.

It is pointed out that there is no international money, and never has been, that balances of trade are settled with bullion and not with coin, and further that we have attained such a commercial position that trade balances can hardly be adverse to us. This calculation is supported by the facts that we always export largely of breadstuffs and provisions, more agricultural products than we import, and that we have entered upon a career of exporting manufactures in excess of imports, the balance in our favor during the last fiscal year being about \$40,000,000, and that our superior natural resources will enable us to maintain this favorable attitude. Hence, it is asserted that we shall not be so troubled about trade balances that we shall need to shape our financial policy so as to be able to command an immense volume of gold. The laboring oar will be shifted to the countries which must pay balances to us.

The two sides are insistent, and the outcome may be postponed indefinitely. It would be best if some plan could be settled upon so just and satisfactory that the question might be set at rest. The very discussion of economic questions, with a view to making changes, is always disconcerting, people engaged in business want certainty, and, as long as there is uncertainty, there will be reluctance to engage in new productive enterprises. Our population has become so great that there should be no embarrassments to the energies and agencies that will afford employment to the laboring classes. A plentiful volume of good money is a tremendous stimulant to industrial and commercial enterprise. The idea is commonly accepted that whatever will pay debt by legal compulsion is good money.

Gas, Gasoline, and Oil Vapor Engines.

The entire lack of literature on explosive motors made in the United States, with the exception of such as have appeared from time to time in our journals and magazines, and the constant inquiry for information on the subject, has induced the author of the work on Gas, Gasoline, and Oil Vapor Engines to endeavor to present in practical shape for the ordinary reader the principles and practice of this class of motors, as they are manufactured in our own country. German, French and English books on gas, gasoline and oil engines scarcely allude to American engines or American practice.

The author says in his preface: "He hopes that, by the publication of this work, many inquiries will be answered, and that seekers for small power will find in the explosive motor the economical prime-mover they desire."

From a careful perusal of the book, it is our opinion that it has far surpassed all the author has claimed for its merits.

The subjects treated in this book are timely and interesting, as there is no doubt as to the increasing use of gas, gasoline and oil engines, particularly for small powers. It gives such general information on the construction, operation and care of these engines that should prove valuable to any one in need of such motors, as well as those already having them in use.

This book is the second edition, revised and enlarged, with 270 illustrations, and can be had by applying to Norman W. Henley & Co., of 132 Nassau Street, New York City.

Patents of Interest to Mining Men.

Messrs. Townsend Bros., Solicitors of Patents, 9 Downey Block, Los Angeles, California, report the following recent patents of interest to mining men:

June 7—605,378 and 605,380. Process of Making Aluminum Sulfid and Process of Producing Aluminum Sulfid and Reducing same to Metallic State. Henry S. Blackmore, Mount Vernon, N. Y., assignor to the Pure Aluminum and Chemical Company, of West Virginia. These two patents relate to improvements in producing aluminum and the process consists in transforming the aluminum oxid into sulfid by simultaneously conveying into a chemically inert molten bath capable of dissolving aluminum sulfid a mixture of aluminum oxid and carbon bisulfid. The process of reducing the sulfid to a metallic state consists in simultaneously converting the insoluble aluminum oxid into soluble aluminum sulfid while in a molten bath, and dissociating the soluble aluminum sulfid by electrolytical action.

June 7—605,451 and 605,464. Continuous Smelting Plant. William S. Reese and Edward E. Armstrong, Natrona, Pa., assignors to the Pennsylvania Salt Manufacturing Company, Philadelphia, Pa. These two patents comprise improvements in smelting plants, essentially consisting of a blast smelting furnace, a movable settler therefor, a series of reducing furnaces, and means for feeding the metal of the settler into any one of said reducing furnaces.

June 7—605,266. Feeder for Stamp Mills. George Wood, Prescott, Arizona. Filed June 12, 1897. An inclined chute is arranged beneath an open hopper and is suspended to shake; an arm projects into the path of the tappet and is adapted to shake the chute to discharge the ore into the battery.

June 7—605,458. Process of Making Sulfids. Henry S. Blackmore, Mount Vernon, N. Y. Process for producing aluminum and other sulfids which consists in exposing a molten aluminate to the action of carbon bisulfid vapor. Patent No. 605,812, dated June 14, issued to the same party, is for the purpose of transforming aluminum oxid into aluminum sulfid which consists in exposing a fused bath containing dissolved aluminum oxid to the action of carbon bisulfid vapor or gas. Patent No. 605,694; same date to the same party, is for the purpose of converting metallic sulfids into metallic cyanids, sulfocyanids, and ferrocyanids, which consists in exposing molten sulfids to the combined action of a metallic carbide and nitrogen gas.

June 14—605,512. Apparatus for Removing Gravel from Frozen Ground. Ralph H. Pinkham, Wakefield, Mass. Filed Jan. 29, 1898. An apparatus for removing gravel from frozen ground, comprising inner and outer pipes terminating in a tapering, perforated point adapted to be driven into the ground, a hot water supply communicating with the space between the pipes, a pump for raising the material through the interior pipe, and an intermediate gravel receptacle between the pump and the tube.

June 14—605,615. Ore Stamp. David M. Smyth, Pasadena. Filed June 9, 1897. The combination with the stamps and the electromagnets for operating the stamps, of a switch that is actuated by an upward movement of one stamp to change the circuit connections for raising the other stamp.

ELECTRIC ROCK DRILLS IN MINING.

Electric rock drills are now being used in different parts of this country, and under a wide range of conditions. While among many the opinion still exists that the electric rock drill is not in every way a success, those who have watched the gradual improvement of the Marvin Drill have become fully convinced of its superiority over other machines. The extremely rugged conditions met with in mining work, and the many failures of newly introduced machinery, have caused many mining engineers to be rather conservative in adopting new machinery, if not skeptical of any machinery which they have not tried. The electric drills, as now manufactured by the Marvin Electric Drill Company, of Canastota, New York, are being enthusiastically received by the mining engineers who have had an opportunity to witness their performance. Within the past few years these drills have been greatly improved, and it can be said, without reserve, that they are now meeting all the requirements of tunnel and quarry work, and in all cases giving unqualified satisfaction.

The successful working of a rock drill depends principally upon three elements, namely: simple design, strong and rugged construction and economical operation, both in point of drilling efficiency and cheap maintenance. These necessary requirements are fulfilled to the utmost degree in the Marvin Electric Drill, and, in addition, this drill is particularly adapted to quarry and mining work, owing to the extreme flexibility of the system.

Those who have watched the development of electrical engineering will realize that today electrical apparatus is turned out which embodies the most rugged mechanical design and high electrical efficiency. Electricity lends itself especially to power transmission, owing to the readiness with which the wires can be strung and the small cost necessary. The advantages of wires over any other mode of transmission is today an acknowledged fact. Wires may be strung in a most temporary manner, and branch lines may be carried to distant points where the power is required without a large outlay of money, and requiring, practically, no expense to keep in order. In prospecting work, where it becomes necessary to convey the power a long distance, and across rough or mountainous country, the electric wires present none of the difficulties encountered in running a pipe line, or moving a boiler from point to point, as the work changes; and, moreover, the wires may be quickly shifted or extended, as the work changes with little attending expense.

Referring to figure 1, showing the section

of a Marvin Electric Drill, it will be observed that the construction of this machine is extremely simple. The main portion of the drill consists of a coil body, comprising two coils of wire (3-3) which form a double solenoid. Within this solenoid is developed the magnetic force which drives a soft steel plunger (1) to and fro, in the same manner that steam actuates the piston in a steam drill. The plunger is a soft steel forging, reduced in section throughout one portion, and at the end is formed a massive chuck (6) to receive the bit. The plunger is indestructible, and will withstand the shock of the blow without breakage or crystallization. The coils are wound with square copper wire and insulated between layers and turns with pure India mica, thus rendering the coils mechanically indestructible and fire-proof, should they receive more current than they are calculated to carry. These coils are incased in an iron jacket, which is calked to the heads of the coils, thus making the coils absolutely water tight. The current is directed into the two coils in alternation by the generator itself, thus doing away with anything in the nature of a valve or switch on the drill. The backward stroke of the plunger is checked by the buffering spring (7), which returns the energy momentarily stored in the spring to the forward stroke. The turning of the plunger is effected by a rifled bar and ratchet device in the back head, similar to that used in other drills. All parts of the drill are equally strong, and in the hands of the most ignorant men, no damage

can be done to the machine. The wearing parts can be easily and cheaply renewed.

By referring to figure 2, showing the drill pulled apart, it will be observed that the different parts of the drill interlock, and are held together by two side bolts and two studs, the latter being integral with the concave slide upon which the different parts are held.

The generator, shown by figure 3, for operating the drills is an extremely simple machine, being so designed that it can be taken down and packed into boxes not exceeding 300 pounds each. This feature becomes necessary, in order that the apparatus may be transported on mule-back.

Three wires are carried from the generator to the centre of the working area, where branch lines may be led to the different drills. The drills operate independently of one another, and the generator regulates the voltage, so that each drill will receive the proper amount of current.

Figure 4 shows the 6" drill mounted on an adjustable column, for tunnel or general underground work.

Figure 5 represents the 6" drill in actual operation underground.

Figure 6 shows 7" drill on tripod mounting.

Electricity in Mining.

The San Francisco *Journal of Electricity* publishes the following interesting and comprehensive article on the chief terms and principles which are fundamental in electrical practice:

It is not a difficult matter to convey to managers of mining properties an understanding of the chief terms of electrical parlance, by comparing these terms with the various conditions of water—that agency with the action of which none are more familiar than miners themselves. As one miner's inch, the unit of volume of water, delivered under a pressure of 480 feet head, will produce one mechanical horse power, so will one ampere, the unit of volume of electricity, if delivered under a pressure of 746 volts, produce one mechanical horse power. The analogy is practically perfect and the busy man of mining affairs who has to do somewhat with electricity need not necessarily delve into electro-techniques beyond that depth which returns the understanding that almost every electri-

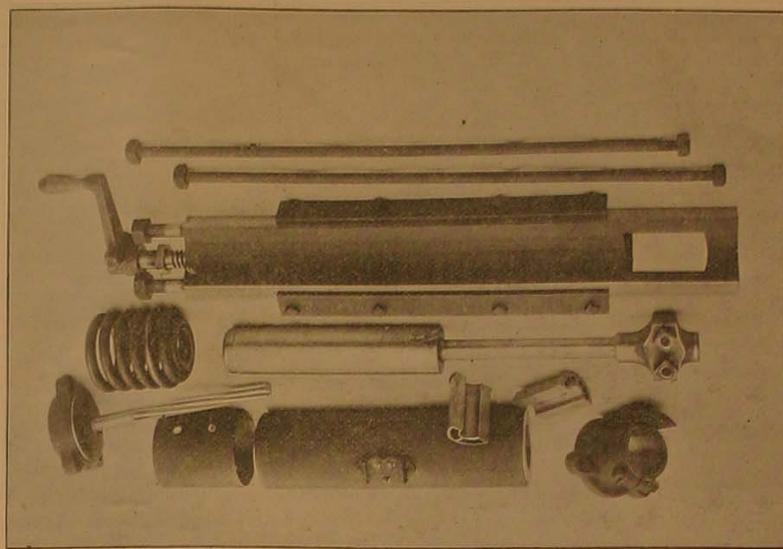


FIG. 2.

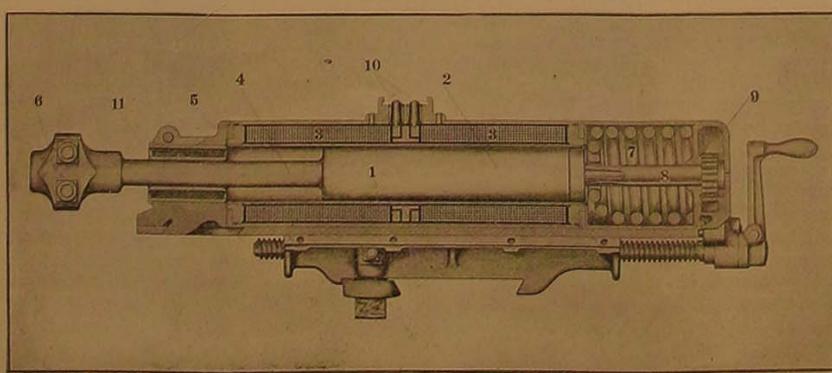


FIG. 1.

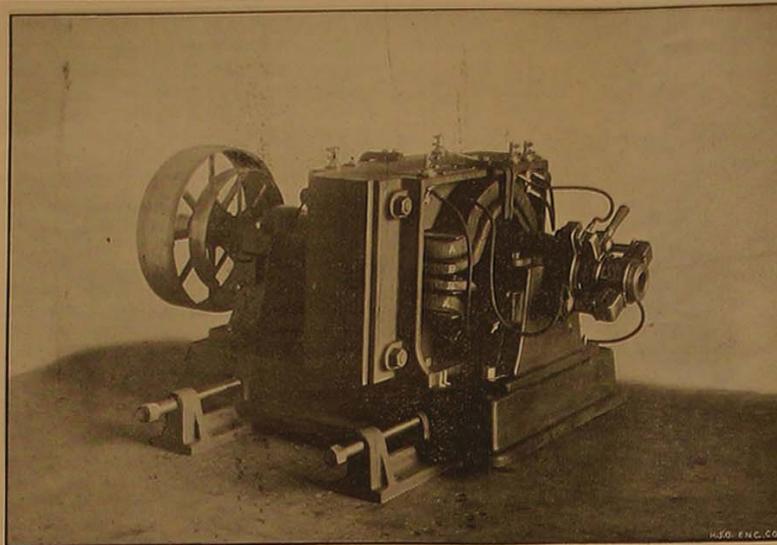


FIG. 3. (See Page 9.)

cal term in every day use finds an analogue in a familiar utilization of water.

It has been shown that the ampere is comparable to the miner's inch, and that the volt is comparable to the head-in-feet, or the pressure of a stream of water. The power obtainable from a stream of water may be found in the product of its weight and velocity—this product being expressed in "foot-pounds"—and there are 33,000 foot pounds to a horse power. Similarly the power obtained from a current of electricity is found in the product of its amperes (weight or volume) and its volts (pressure or velocity)—this product being expressed in "watts"—and there are 746 watts to a horse power. Where any power of considerable magnitude is under consideration, its equivalent in watts would be so great, numerically as to be inconvenient of expression, hence the Greek prefix "kilo" signifying 1,000 is used exactly as in the metric system, and thus the energy of one hundred and seventy-five thousand watts is expressed as 175 kilowatts. Since in the watt is represented the product of volts and amperes, it is obvious that 175 kilowatts, for instance, may represent an energy of 10,000 volts and 17.5 amperes, or that the two factors may have any value which will give 175,000 as their product. Here the cited analogue still holds, for the same is true of the energy of a stream of water when expressed in foot-pounds.

But water in flowing through a pipe line encounters resistance from friction with the sides of the pipe and from bends or other changes in the direction of flow. Hydraulics characterize the resistance as the "coefficient of resistance," which is a variable quantity, and which is not expressed in terms of standardized unity. It is practically in the same manner that a current of electricity, in traversing a wire, encounters resistance, the amount of which varies greatly with the metal of which the wire is made. Silver offers the least resistance of any metal to the flow of electricity; copper has about 98 per cent of the conductivity of silver, while iron has less than one-sixth of the conductivity of copper. In electricity the unit of resistance is the "ohm" and its value is such that when a pressure of one volt is applied to such a length or cross section of wire that the current which flows through the wire will be one ampere, then the resistance of the wire will be one ohm. A parallel to this would be

found in hydraulics where the length and diameter of a pipe is such that under a head of one foot, exactly one miner's inch of water would flow through the pipe. The coefficient of resistance of this pipe is analogous to the term of "ohm"—the unit of electrical resistance.

Electricity, if of the direct current form, traverses the conducting wire in one direction, as does water in a pipe line. Sometimes pulsating currents are used, and these, like water in the supply pipe of a hydraulic ram, flow in a single direction, but are interrupted periodically. Then there are alternating currents of electricity which are of a vibrating character and oscillate in one direction and then in the other, alternately, as water would do in a pipe, each end of which is connected to a respective side of a piston chamber having no valves, in which event the direction of flow of water through the pipe would alternate with the direction of the piston stroke.

It is unfortunate for lucid analogy that there is no practical, familiar parallel in hydraulic practices by which the nature of the varieties of alternating currents may be illustrated, and this misfortune is the greater because of the knowledge that alternating currents are destined to take a far more important part in all mining applications of electricity, except in electro metallurgy, than any other form of the ubiquitous agency called electricity. Hydraulic conditions of suppositional forms must therefore be improvised to complete the analogue.

An oscillating current of the form described, in which electricity flows back and forth as water in a pipe connected to a piston chamber without valves, forms the simplest type of alternating currents, and such a current is termed a "single-phase" current. This may be fixed in mind by conceiving the water device to be driven by a single piston, actuated from a single crank disc, throwing the water in the pipe into a state of single oscillation or single alternation—technically "single phase." The rate

of this oscillation, when applied electrically, is termed the "periodicity," or the "rate of alternation" of the circuit.

Suppose, however, that there are two such single pipes, entirely independent of but paralleling each other, and containing water alternated in flow as in the previous instance, by valveless piston chambers. If the pistons of the respective chambers are always in unison as to speed and position as they would be were they driven from the same crank pin of a shaft, then the volumes of water in the two pipes would pulsate in perfect harmony as to rate, speed and direction, or to use an electrical term, the currents would be in "synchronism." But should the two pistons be actuated from independent crank pins placed diametrically opposite on the driving shaft, then the flow of water in one pipe would be exactly opposite to that of the water in the second pipe, which may be described as a "two current" or "two flow" system. It is precisely such a condition as this which exists in the two electrical circuits of the "two phase" alternating current electric transmission system.

Again, instead of the two valveless chambers and pipe system just described, assume that there are three such systems, each identical in construction to the others, with the solitary exception that the pump pistons are respectively driven from crank pins placed 120 degrees apart on a shaft, in which event the direction of flow in pipe No. 2 will be one-third of a stroke or revolution behind that in pipe No. 1. Similarly system 3 will "lag" one-third of a stroke behind No. 2; system No. 1 will lag one-third of a stroke behind No. 3, and so on, all this being analogous to a "three-phase" alternating current system. Thus are illustrated the different types of polyphase systems,—as all varieties of alternating currents in excess of the single phase system are termed.

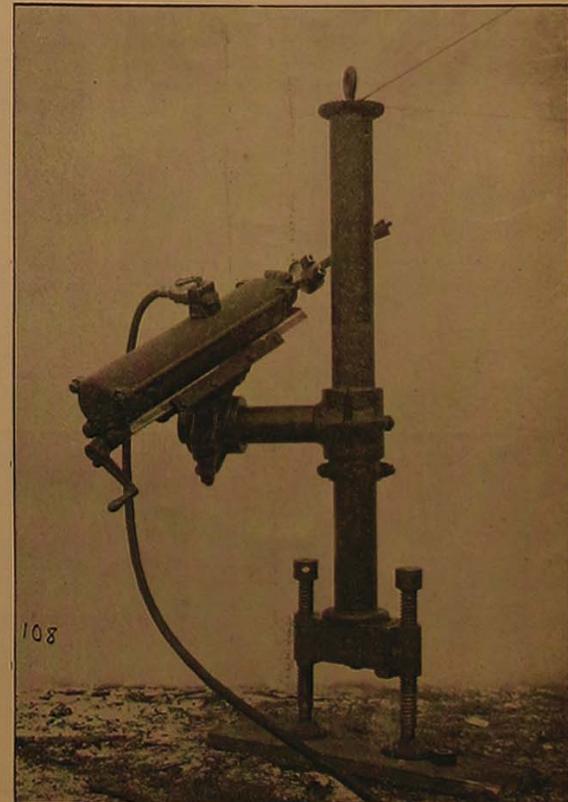


FIG. 4. (See Page 9.)

But what is the advantage of different phases? Simply this: As hot water in flowing through a pipe influences the temperature of the air surrounding it, so does electricity in flowing through a wire influence the ether surrounding the wire—in fact, magnetizes it, the direction of magnetic pull (so to speak) varying with the direction of electric current flow. A north magnetic polarity and a south magnetic polarity will attract each other, as all know, and owing to the fact that in two-phase systems the direction of electric current flow in the two circuits is always exactly opposite, the ether surrounding one wire is always of exactly opposite magnetic polarity to the ether surrounding the other wire, hence in two-phase electric motors there is always a state of mutual magnetic attraction between that part of the motor containing the "leading" phase and that part of the motor containing the "lagging" phase.

Single phase circuits are by nature restricted to but a single magnetic polarity of the surrounding ether at a given interval, and as it takes opposite magnetic polarities to exert attraction toward each other, it is evident that the production of power from single phase current is seriously handicapped by its own inherent characteristic. This idea roughly explains why the development of single phase motors is so tardy.

In three phase systems, the phase impulses follow each other consecutively with absolute regularity, and inasmuch as "fields" or atmospheres of magnetism attend the appearance or disappearance of each impulse it is evident that the revolving motion of these consecutive impulses impart a similar rotation to the attending magnetic field, which explains the term "rotating field." If a strong magnetic field revolves, obviously any magnetic body placed within that field will tend to revolve with it and to this principle is due the three phase motor.

Finally, the transformer or converter is just what its name indicates, or rather, what its name would indicate were the word electrically prefixed. It is merely a device for automatically transforming electrical energy or "wattage" from one value to another. The transformer is to electricity what an appliance would be to hydraulics that would take the energy of a small stream of water at high head and transform it with but small loss to the energy of a large stream of water at low head, or vice versa. Were there an

equivalent appliance in hydraulics, this "hydraulic transformer" would convert the irresistible tidal flow, or any portion of it, to a much smaller volume of water at a tremendously high head, thereby enabling an easy solution of the long hoped for utilization of the tides for power purposes.

It must be borne in mind that the foregoing has been written with the idea of imparting most elementary ideas to those who have neither time nor inclination to become possessed of any but a superficial knowledge of the chief terms and principles which are fundamental in electrical practices. The wisdom of experience has well taught that "a little knowledge is a dangerous thing," and the above is a little, indeed, a very, very little, of the knowledge of which science is possessed concerning electricity, and to accept every statement given as an indisputable exposition of most recent practices would be an error, for, as intimated, an elementary and brief explanation of a profound subject can not be swerved from its purpose by considerations other than those of the barest generalities.

Miners interested in electrical power will find this article well worth preserving.



FIG. 5. (See page 9.)



FIG. 6. (See Page 9.)

The International Mining Congress.

The International Mining Congress opened under auspicious conditions with upwards of 1000 delegates present, representing twenty-seven states and territories. The address of welcome was made by Gov. Wells.

The committees on credentials, organization and other details reported, which set the machinery in full operation.

One of these committees was directed to consider and formulate a report upon the establishment of a national department of mines and mining; the other was to report on the revision and codification of the federal mining laws. Both committees will be ready to present their conclusions when called upon by the congress.

Among the subjects to be presented in papers prepared especially for the occasion by men of wide experience are the following: Coal and Coke; Advances in Methods of Concentration; Relation of the Geological Survey to the Mining Industry; Relative Merits of Cyaniding and Chlorination; Mine Inspection; History of Reduction of Smelting Costs; Long Distance Transmission of Electric Power; Fuel Cost in Pumping; Recent Advances in Smelting; A New Treatment of Low Grade Ore; Copper; Relations of Investors and Miners. All of these papers are ready or in course of preparation by men conspicuous for their knowledge of the subjects treated. As they are presented, they will be discussed by the congress, and it is expected will prove of the greatest practical value.

The Weber Gas and Gasoline Engine Co. of 434 S. W. Boulevard, Kansas City, Mo., report increased activity in their works, being well booked with orders at this time and running over time. They have just installed another 74" Boring Mill.

All business men and those doing business in the United States should have a copy of the new *War Revenue Bill* passed by act of Congress, approved June 13th, 1898, for handy reference. J. Bell of 121 N. Broadway, Los Angeles, Cal., has recently published a small booklet of the new law, reproduced by photo process from a copy printed in the Government Printing Office at Washington, D. C. Send twelve cents for copy.

CORRESPONDENCE

UTAH

SALT LAKE, July 4th, 1898.

EDITOR JOURNAL:—There is nothing new to report in Ajax. The work of sinking the main shaft goes steadily on. Alice was inactive, and the same may be said of Alliance and Anchor. Buckeye was stronger. The assessment of $\frac{1}{2}$ of a cent per share will become delinquent on the 27th. Bullion Beck was weaker. There is no information given out relative to a new contract with the smelters. Centennial-Eureka was stronger on renewal of rumors that dividends will be resumed. I can obtain no information to this effect, however. Chloride Point was stronger on inside buying. The mill is working steadily, and a cyanide shipment is in order.

Dalton grows weaker and weaker. Dalton & Lark was decidedly stronger. The mine has been cleared of water and mining operations will be resumed. The company, it is anticipated, will be able to continue its monthly payments, upon the balance due for the purchase of the Lead Mine group, and stockholders cannot hope for any return in the shape of dividends for some time to come. The amount of this particular indebtedness is said to be \$66,000. Daly was steady. Daly West quotations were unchanged. There is nothing of importance to relate as to Four Aces. The management is pushing development work.

Galena was featureless. Geyser Marion did not hold its strength on the dividend announcement. The dividend of 2 cents per share was paid to stockholders on the 30th. Good reports continue to come in from the mine. Grand Central continues to hold the interest of the public. Big shipments of high grade ore are coming in regularly. The stock was steady at \$7 bid and offerings are very light. Horn Silver paid its dividend of \$20,000 on the 30th. This carries the total to \$5,140,000. Good orders are out for Little Pittsburg around $\frac{1}{2}$ cents, but little stock is being offered below 3 cents.

Sunbeam holds up fairly well. Silver King was steady, but no stock is coming out. Sacramento is gradually declining to a basis, where its value is in keeping with the dividends paid. The regular dividend of \$5,000 was paid on the 30th. The mill is treating 150 tons a day regularly. South Swansea paid its dividend of \$7,500 on the 30th. The stock was weaker and slumpy this week. Swansea was strong and in demand. The mine is looking exceedingly well.

Miscellaneous Mining News.

ALASKA.

A party of gold seekers that left Flemington, N. J., on March 1st, for the gold fields, returned on June 21st. The party tried to reach the interior by way of Yakutak and Disenchantment Bay, but only got as far as the fourth glacier when they found it utterly impossible to go further. They report that there are about 400 on the way to the foot of the glacier who will succeed no better. Gross reports have been circulated about the different districts they found. In one case a man who was said to have brought out \$5,000 in nuggets and to have refused \$30,000 for his claim, had never been to the gold fields at all.

ARIZONA.

The Omaha *World* says: "By far the most interesting and remarkable display in the mining building is the exhibit from Arizona. That has been given the place of honor. It consists of a magnificent collection of the copper minerals from the Copper Queen mine, Bisbee, Ariz., particularly azurite and malachite. This collection was made with a view to the Paris exposition as well as Omaha. For the exhibit four large showcases were sent that were used by the same company at the World's Fair. Dr. Day could not make them suit his purpose for his idea of showing his exhibit properly, and he sent to Washington for an enormous plate glass case, which will be the first object seen on entering the rotunda.

CALIFORNIA.

KERN COUNTY.

About seventy tons of ore, averaging about \$85 per ton, have been run at the Johannesburg mill during the last ten or twelve days. Another rich strike has been made in Trilby No. 2, and over \$3000 was taken out in one day. The ore is fairly bristling with the yellow stuff we are all looking after.

Ore is being shipped to the Barstow mill right along, each car being loaded with about twenty five tons, and a watchman accompanies each car. His duty is to ride down on the car and guard it to its destination, where he turns it over to Mr. Harry Cooper and returns to guard the next lot down. Thirty stamps of the new mill are kept constantly dropping on this ore. It is shipped loose instead of being sacked. The mill seems to be in good condition, and is doing good work.—*Randsburg Miner*.

It is rumored that a fifty-ton smelter is soon to be erected at Randsburg, which is to be worked on a new and very cheap principle. Gases produced from crude oil is to serve for fuel. Experiments with a working model are said to justify anticipation of the success of the enterprise. Miners will await further developments with interest.

LOS ANGELES COUNTY.

Morris and Robb, of Colton, have returned from a visit to their properties near "Old Baldy" mountain. They report that the Hocumac Hydraulic Placer Mining Company in that district is actively engaged on their claims.

RIVERSIDE COUNTY.

J. C. Littlepage, of San Bernardino, has purchased a half interest in the San Bernardino mine in the Dale district. This claim is pronounced by old miners to be one of the best in the Dale country. There is between \$10,000 and \$12,000 worth of ore in sight.

Information is received that a four-foot vein of rich ore has been uncovered in the Harriet Belle mine, near Riverside.

The tailings of the Desert Queen mine will be cyanided in the tanks of the Old Virginia mine by Jackson Steele, who has purchased them.

SAN BERNARDINO COUNTY.

E. H. Keith, of Oro Grande, reports mining business quiet in the Silver Mountain district. He is interested in the Fordroiant mine. Some work is being done there as

well as in most of the other gold mines of the district. The Side Winder, owned by Oro Grande and Los Angeles parties, is attracting attention. It is expected that a force of workmen will soon be put to work there. A smelter at Ore Grande is the great desideratum. For such an enterprise there is a splendid opening. The investment would, Mr. Keith believes, pay richly and be of incalculable benefit to the mining interests of the district. There are many good silver mines in the district, but all are idle.

SAN DIEGO COUNTY.

Receiver Pauly, of the Golden Cross mines, last week presented his seventh report to the superior court, covering the month of May. The report says that a large profit is being made out of the operation of the mines. From the clean-up on June 1, there was realized \$46,444.94, and from other sources \$1,499.50 was obtained.

The total expenditures, including \$11,500, which under stipulation is paid to the defendants in the action each month, amounted to \$48,021.73. The payroll for the month was \$10,300. There was \$56,903.73 on hand on the 31st of May. Forty additional stamps were started on June 1, and Receiver Pauly says that he believes that he will be able to furnish ore for them as well as for the 100 stamps which have been in operation. The report was approved by Judge Torrance.

COLORADO.

Cripple Creek Notes.

All the shipping mines were busy last week and the same old story of crowded cars, ore bins, wagons, samplers, reduction plants and smelters has to be told. We do not have to go very far to see the effects of the great activity among the shippers, for at the works of the Colorado-Philadelphia Company, at Colorado City, (the largest chlorination plant in the country) an immense amount of ore is handled, and there are always huge piles of it over there awaiting treatment. That the big plant is busy and successful is shown by the fact that the men's wages there have been lately subject to a considerable increase. It was a voluntary move on the part of the management, but was not the less welcome to the workers.

Following are a few of the shipments credited to the Matoa during the past few days: $5\frac{1}{2}$ tons, average 2.95 ounces in gold per ton, aggregate net value of lot, \$3,485.86; $5\frac{1}{2}$ tons, average 2.25 ounces in gold per ton, aggregate net value, \$1,489.96; 55 tons, average 2.65 ounces in gold per ton, aggregate net value, \$1,475.59; 54 tons, average 2.81 ounces in gold per ton, aggregate net value of the lot, \$2,234.47.

Lessees on the Specimen continue busy and are sending out numerous lots of low grade ore together with one or two assortments of high grade. During the past ten days or so the following have been recorded: From lease Q, 4 tons of \$17 ore, and 4 tons of \$13.70 ore; from lease F, $2\frac{1}{2}$ tons of \$94.85 ore; from lease F No. 2, $7\frac{1}{2}$ tons of \$14.90 ore; from lease P No. 2, 4 tons of \$38.10 ore; from lease O, 4 tons of \$24 ore, and 7 tons of \$12 ore; from lease P No. 2, 5 tons of \$13.80 ore.

The following shipments were made by lessees operating on various parts of the Union Company's properties last week: From the Orpha May, 15 tons, value \$76.90 per ton;

4½ tons, value \$53.20 per ton; 2½ tons, value \$256.60 per ton. Two shipments to mill and smelter yet to be heard from. Dump ore: 7½ tons, value \$46.40 per ton; 4½ tons, value \$17.70 per ton; 5½ tons, value \$22 per ton; 2 tons, value \$36.20 per ton. From the Porcupine: 5 tons, value \$30.70 per ton.—*Mining Investor.*

At Leadville.

The Home Mining Company last week placed a few men at work at the Bon Air and Penrose properties cleaning up and making repairs preparatory to starting the pumps. It will take about ten days or two weeks to complete this preparatory work, after which, it is stated, the pumps will be started at once, as the other members of the Leadville Pumping association who are to assist in the downtown properties have everything in readiness to start up. This is the first work that has been done in this territory since the strike, and the beginning of the new work means much for the camp. Even after the pumps start, which now seems possible in two weeks, it will take at least 90 days to clear the workings of water.

IDAHO.

The *Florence Miner* says: "The Blossom mine has been bonded to J. H. O'Dell. We understand the price is \$22,500, with \$2,500 down, and the balance in three, six and nine months. This is the same mine which was bonded by Captain Moore last fall for \$10,000 and \$1,000 forfeit paid, when from some cause unknown to us the bond was allowed to lapse and the money paid forfeited. At that time it was considered by many as an ill omen for the camp, as it was one of the most promising properties in the district. After the mine fell back into the hands of Mr. Fisher and his partners they spent some time in further development, and have now made the deal as described above. We understand that the mine goes into the hands of parties who are abundantly able financially to thoroughly equip with first-class machinery, and we predict it will soon be one of the gold producers of Florence camp. Messrs. Dahl, Olson, Fischer and Jarren are now pumping the water out of the mine and putting it in shape to work a large force of men."

MICHIGAN.

The Michigan Copper Mining Company was organized some months ago with a capital stock of \$2,500,000, to operate in Rockland and Greenland townships, Ontonagon county. A. M. Low of Detroit secured options on 4,720 acres of land, owned by the heirs of Benjamin Jeffs. The work of developing the property, it is said, will begin at once. The officers of the corporation are: President, Edwin F. Conely of Detroit; vice-president, William B. Jeffs of Rockland; secretary, Alfred M. Low of Detroit; treasurer, E. H. Flinn of Detroit. The directors are: George N. Fletcher, J. B. Book, Albert Pack, Patrick A. Ducey, Jerome Croul and George Stevens.

MINNESOTA.

The previous low freight rates have taken a drop and ore is being openly carried from Duluth, Two Harbors and Ashland to Lake Erie, little less than 1000 miles, for 45c. a

gross ton, and it is stated that private charters are made at 5c. less than that. It costs the vessel that carries this ore about 17c. for handling the ore—2½c. for trimming at the port of shipment, and 14 to 15c. a ton for unloading, this sum taken from the 45 or 40c. for the haul leaves only 28 to 23c. a ton net for the ship. These rates are the lowest ever made, and yet it is generally understood, denials of the interested vessel men, that the larger ships are making a little money on their business.—*Engineering and Mining Journal.*

MISSOURI.

The Central Lead Company, of St. Louis, has increased its capital from \$400,000 to \$1,000,000. C. S. Rogers, the secretary, has stated that the proceeds of the sale of the additional stock had been devoted to the purchase of additional land, of which the Central now has 1,600 acres. Its capacity at present is 375 pigs a day. The officers are: Arthur Thacher, president; F. H. Ludington, vice-president; C. S. Rogers, secretary and treasurer. The assets are placed at \$1,073,213; the liabilities, \$67,128.

The Desloge Consolidated Lead Company, of St. Louis, has increased its stock from \$200,000 to \$1,000,000. It is stated that the increase mainly represents money already spent in improving the property. The stock is held by ten persons, and there are but five directors. They own about 2,300 acres of land, and have spent \$500,000 in improvements of various kinds. It is also stated that money represented by this new stock will be placed in the treasury and used in the further development of the property, for additions to the holdings of land and for improvements. The company's last statement shows assets of \$1,000,000, of liabilities of \$29,612. Its officers are: President, Louis Fusz; vice-president and treasurer, Firman Desloge, and secretary, John F. Valle.

MONTANA.

There are a few men employed at the Yellowstone mine at Castle. In the immediate future a number of men will be put to work on the mine.

The surface indications of the Home Stake mine at Castle are good. It will take digging and shoveling to tell how the mine is going pan out.

It is rumored at Castle that James Knight has struck a good body of ore on the Uncle Sam mine. The specimens of ore from the new discovery on the mine look good.

Barney Tierney, the owner of the Katie mine at Castle, Meagher County, has associated with himself, on a six months lease, Billy Connor, who is a good miner. This property is looking promising, and is being worked in the shoot of ore recently opened up in the tunnel. Mr. Tierney showed some good specimens of ore from his favorite mine.—*Helena Independent.*

The new No. 4 tunnel, at the East Pacific, near Winston, Jefferson County, is now in over 800 feet, it is said, with a long distance to run before encountering the ore body it is headed for. Four teams of fours are now employed hauling ore from the E. P.

The Stray Horse tunnel, at Winston, is now in nearly 300 feet, with the ground fav-

orable to rapid progress. It has already passed through one streak of ore, to which the management has as yet paid no attention, but is driving ahead for the main lead.

NEVADA.

The Ione Gold Mining Company's group of mines, near Ione, Nye County, Nevada, have been sold to the Nevada Mining Company for \$200,000.

The mining realty of the Dexter Gold Mining and Milling Co. consists of about sixty acres patented, besides mill sites and other surface rights. This is a gold property of undoubted worth. Some of the ore is of sensational richness, though the vast bulk is now smelting low grade, carrying \$5 to \$15 per ton. An electric power transmission plant, utilizing water for source of power, was put in last year, besides a 40-stamp mill. The power generated fell short of requirements and an additional water supply is just secured. Tailings from stamp mill, after passing over plates, are cyanided and this double system of winning the gold does clean work.

NEW MEXICO.

Output of Hillsboro gold mines for the week ending Thursday, June 30th, 1898, as reported for *The Advocate*:

	Tons
Wicks.....	15
K. K.	10
Richmond.....	15
Snake Group.....	50
Opportunity.....	15
Sherman.....	5
Cincinnati.....	10
Tripp.....	25
Rex (silver-lead).....	5
Total.....	150
Total output since Jan. 1, 1898.—	3,880.

A meeting of the stockholders of the Monetzuma Gold Mining and Placer company was held in Scharnagel hall, Kansas City, Mo., on June 20th. A. H. Glasner was elected president and treasurer, A. Komeiser vice president, and Chas. J. Dold secretary and manager. The following gentlemen, including the above officers, were made directors: Grant Blake, Joe Bahr, John A. Gysin and G. J. Kammerer. Mr. Dold is expected at Elizabethtown in a few days, and work will probably be resumed immediately upon his return.—*Elizabethtown Miner.*

OREGON.

Lane County Mines.

Lane County's mining industry is not behind the times; in fact, more interest is now being taken, more money expended, and more time devoted to the development of mining claims than ever before. Through a private letter from E. B. Hawley, it learned that everything is on a boom in Bohemia. Extra forces of hands are employed in tunneling and blasting. To meet the demand it has been necessary to increase the wood and coal crews.

Robert McMurphy and brother, of Eugene, who have made two trips to the mines this summer, have purchased the Eureka claim,

together with an adjoining claim and a fractional part of a third claim. Very rich ores are being uncovered every day, and the great value of these mines is becoming more apparent constantly. The development of these mines means added wealth to Lane County, and will be watched with much interest by every citizen.

Edward Geiser, who is in Baker City, last week received a message from the Bonanza mine, conveying the pleasing information that on Friday evening the miners at work in the face of the 1800-foot crosscut tunnel broke through the casing and uncovered another big ledge. When the casing broke, the rush of water was so great as to fill the tunnel to a depth of three or four feet. The miners were forced to wade waist deep or more to reach dry land.

The Shorty-Hope mines, near Ashland, have installed their new machinery, and it is in fine working order, and running night and day. The owners are greatly pleased with results.

The Oregon Placer Mining Company, of Union, with J. H. Pomeroy, T. H. Crawford and John L. Austin as incorporators, have filed articles of incorporation.

SOUTH DAKOTA.

The Homestake Company, on the 25th of this month, will pay to the stockholders the 243rd consecutive monthly dividend of 50 cents a share.

The machinery for the hoist at the shaft on the Detroit and Deadwood Mining Company's property in Two Bit, arrived from Chicago on the 16th and is being installed.

F. Pozansky and others, who own a group of claims one mile north of Pactola, recently encountered a body of free-milling ore that gives excellent results in gold by pan tests.

R. C. McShane is engaged placing a pump and boiler at the shaft on the Pittsburg, in the Yellow Creek district, where work will soon begin, exploring the quartzite for the ore shoots.

A rich discovery of copper ore was reported to have been recently developed near the city limits of Deadwood. The ore is an altered sandstone matrix, impregnated by small particles of metallic copper.—*Black Hill Mining Review.*

UTAH.

Captain J. R. De La Mar, of the De La Mar mines, has been in Mercur lately, the first visit for a year. The mammoth cyaniding plant, he states is achieving thoroughly satisfactory results, all things considered. The mechanical drawbacks are remedied, save the handling of the ore from the roaster. This is being righted, and 450 tons per diem are treated. The captain will not be content until 800 to 1000 tons daily are handled, and the required enlargement will be made immediately.

At Centennial Eureka, near Eureka, Juab County, a night shift of 40 men was put on last week, making 100 all told. With the recent uncovering of considerable ore of better grade than ordinary, the inference is a larger production soon.

The articles of incorporation of the Joe Bowers Mining Company were filed with the Secretary of State June 11th. Capitalization, \$400,000; share, \$1; with 100,000 set apart

for treasury needs; stock assessable. Principal office Salt Lake City; annual meeting first Monday in April. Officers and directors: James A. Brown, president; J. H. Stallings, vice-president; W. F. Smith, secretary-treasurer; John T. Hodson, John Hupfer. Realty consists of Joe Bowers No. 2, Hard Tack and Johnston claims, in the Silver City portion of Tintic. There is a 200-foot shaft with considerable drifting and several cars of ore have been shipped. A steam hoist is to be installed.

In Silver King, at Park City, a crosscut through the ledge from 1,100 level shows an ore width of 150 feet between containing walls. It is said the reserves blocked out assure the continuance of dividends at present rate for five years.

WASHINGTON.

Stevens County Mines.

Considerable work has been done on the Union mine lately and the property is showing up in fine shape. It is situated near the Conquest, not far from Marshall lake, and is owned by J. W. Ryan and Arnold Reinhardt.

Messrs. T. F. Meagher and Austin Mires of Ellensburg have purchased four claims in Sheridan camp from Dr. S. H. Manley, J. L. Hadley and Andrew Johnson. The claims are called the Superior No. 1, No. 2, No. 3 and No. 4. The sum paid for them was \$10,000. The group adjoins the Polar Star group upon which as much if not more work has been done than on any claim of the camp, and which is considered good property. It is the intention of the purchasers to do considerable development work upon the Superior group this summer. Mr. Mires is a leading attorney of Ellensburg, and Mr. Meagher is heavily interested in the Swauk placer mining district.

The Irene and U. S. claims in Bodie camp, have been bonded by Vaughn and Brennan for \$10,000 to St. Paul people, who intend going to work at once. The Lazetta claim owned by Herman DeWitt and Fred Muhs, is also being developed.

Free gold has been struck in the Polar Star in Sheridan camp.—*Spokane Miner and Electrician.*

FOREIGN MINING NEWS

BRITISH COLUMBIA.

At a meeting of the stockholders of the Ashcroft Gold Mining Company, held at the company's office in Ashcroft, and attended by nearly all of the stockholders in person or by proxy, it was decided to increase the capital stock of the company to \$50,000, and as soon as arrangements could be concluded, to begin the construction of a flume and ditch to add to the water supply. The showing, so far this season, for the limited amount of ground handled, is regarded as good.

The British Columbia Gold Fields Company of Toronto has recently placed an extensive order with the Jenckes Machine Company for a ten-stamp battery complete with two vanners, two ore feeders, grizzly, Blake-Marsden crusher, and all the various apparatus making up a complete modern milling plant. The outfit is to be delivered at Nelson, B. C.

The British Columbia Copper Company, Anaconda, B. C., have just contracted with the James Copper Manufacturing Company, Limited, Montreal, for the installation of an Ingersoll Sergeant ten-drill compressor plant, complete with ten drills, battery of boilers, Lidgerwood hoisting engines, pumps, heaters, and all necessary equipment to make the plant complete.—*B. C. Mining Critic.*

LOWER CALIFORNIA.

It is learned from Mr. Charles Bennett that the steam pump is now in position at the Valadares placers, and they soon expect to be scraping the bedrock of the creek. The pump is a centrifugal machine and has a capacity of from 50,000 to 60,000 gallons of water per hour. Steam is furnished from a twenty-five H.-P. boiler, and the water will be raised anywhere between fifteen and thirty feet, the depth of the gravel to bedrock not having yet been determined. There have been many attempts to work these placers, which are known to be rich, but all have failed signally from the fact that very considerable water at all times seeps through the sands of the Valadares and interfered to such an extent that mining was impossible. To overcome this difficulty it has been necessary to build a road sixty miles over a rough and broken country to the coast and move in heavy machinery. This accomplished, however, there is now little doubt as to results.

MEXICO.

The official report of the Batopilas mine, Alexander Shepherd's bonanza property, for the year 1896-7, has been published. The total workings for these years was \$23,700 feet, and ore to the amount of \$43,807,612 pounds was taken out, valued at \$907,626 (Mex.), of which \$690,595 was in silver bars. The expenses were \$1,360,522, showing a deficit of \$452,896. The debt of the company is \$681,347 (Mex.) and \$369,997 gold, unfunded, and 6 per cent bonds for \$450,700. The Porfirio Diaz tunnel is now in 6,069 feet, and advancing at the rate of 100 feet a month. In 550 feet more it will cut the Todos Santos vein and the Roncesvalles 360 feet further on, which will reduce the cost of working these veins. The company is now doing its own casting at a great saving of expense, and proposes to increase its milling facilities.

The Anita Mining and Milling Company, a new corporation, is a new organization, composed mostly of men from Cucamonga and Ontario, San Bernardino County, California. The company possesses a capital stock of \$480,000, divided into ten shares, \$384,000 being contributed by the directors, as follows: F. E. Trask, \$132,000; I. S. Miller, \$20,000; H. T. Hughes, \$40,000; S. G. Vandegrift, \$20,000; R. C. P. Smith, \$132,000; C. W. Allen, Cucamonga, \$20,000. The mines are located in the Atlas district, Sonora, Mexico.—*Transcript.*

Copper Mining on Lake Superior.

(Concluded from our last issue.)

The head current of water coming from the stamp heads, in which float the light material and fine dirt, is turned from the main launder into lateral ducts, which convey it to the large slime tables over whose conical-shaped, slow-moving surface it is made to pass.

The stamp mills and copper crushing machinery used at the copper mines on Lake Superior have reached a high state of perfection. The advance which has been made in this region in this department of mining work, from the crude iron shod wooden stamps and hand boulders of an early day to the stupendous structures with their intricate machinery, that now successfully perform the work, is certainly wonderful. The simple mill wherein could only be stamped and manipulated a few tons of rock per day, and at a cost too great for profit, has given place to those with a capacity of 5,000 and 6,000 tons per day, wherein the manipulation is attended with but a tithe of the cost and difficulty which were inseparable from the earlier attempts. The work has been so perfected that 33 cents would cover the entire cost of treating a ton of rock in the stamp mill.

Perfect and systematic as the mechanical manipulations in copper mining have become, there is yet a waste of copper in the tailings. This waste varies from one-fourth to one-half per cent, and this is in the aggregate product of the Calumet and Hecla mill, which stamps 4,000 tons of rock per day, average, represents a very important value at the end of each year.

The pumping engine, Michigan, the largest in the copper country, has a capacity of 60,000,000 gallons every twenty-four hours. The engine is of the triple-expansion pattern, has steam cylinders 18, 28½ and 18 inches diameter by 90 inches stroke, and is capable of lifting 1,400 gallons at every revolution. Its height from base to summit is 56 feet. The diameter of the fly wheel is 25 feet and its weight 30 tons. The foundation upon which this engine rests contains 912,000 bricks, 3,000 barrels of Portland cement and 300 tons of granite cap stones.

The big sand wheels are 50 feet in diameter, and have a lifting capacity of 30,000,000 gallons of water each and 3,000 tons of sand every twenty-four hours. The sand from the mill carried out into the lake by a system of launders has made hundreds of acres of artificial peninsulas, while the lake itself, once a beautiful blue, is now dyed to a deep pink from the effects of the red conglomerate. The yield of refined copper at the Calumet and Hecla mine to the cubic fathoms of ground broken, is 850 pounds; yield of mineral per fathom of ground broken, 1,130 pounds; yield of refined copper per ton of rock stamped, 52.78 pounds; percentage of copper in stamp rock, 75 pounds average.

During 1897 the Calumet and Hecla mill treated on an average 4,100 tons of rock per day, which yielded an average of 5,850 tons mineral per month.

A conception cannot easily be formed of the tremendous displacement that is going on underground in this mine. As J. H. Wilson, of the *Native Copper Times*, the most reliable mining paper on Lake Superior puts it, "Imagine a great trench, two-miles long, twenty feet wide and one hundred feet deep, and you may form some idea of the openings which the annual product necessitates."

Many persons will wonder how long the mine can last with such a great production. But when they are told that the mine is at present opened up thirteen years in advance of the stoping, they will cease to wonder. Besides this they have territory as yet untouched which insures thirty years more at the present rate of production.

The Red Jacket shaft of the Calumet and Hecla, and which went into commission last April, is the deepest in all the world. Im-

agine a great hole, measuring 14x22½ feet inside the timbers, penetrating into the bowels of the earth, straight as an arrow, for 5,000 feet. This shaft which has a capacity of four times that of the old shafts, is constructed after the following manner:

The first crosscut which connects the shaft is at a depth of 2,106 feet, has a length of 1,553 feet, and intersects No. 4 shaft at the 36 level. The second crosscut, at a depth of 2,290 feet, intersects the "lode" at the 39th level, while the third crosscut intersects it again at the 42nd level, at a depth of 2,493 feet. From the latter intersection the levels range 90 feet apart, and afford access to all parts of the mine. Each level has three openings at the shaft proper, which is the main entrance, while on the northwest and south sides, the openings are made with a curve until they reach the main drift, at a distance of 175 feet from the shaft proper.

The largest number of feet sunk in any one month was 69½ and in one week 17¼, and the least number in one week was 12 feet. The cost of sinking averaged \$25.70 per foot.

Calumet and Hecla Surface Workings: Looking over the surface workings of this great mine, one is impressed with the idea that he is inspecting a literal exposition of machinery. No other mining company can begin to cope with it in the amount of horse power employed. The great Superior engine, which operates the drums at the Calumet branch, develops 4,500 horse power. The shaft of this engine is of steel, 16 inches in diameter, and the balance wheels, of which there are two, are thirty-three feet in diameter and weigh 40 tons each. The engine is run to a speed of 55 revolutions per minute.

The twin engines, Minong and Messnard, of 3,000 horse power each; the four triple-expansion engines of the Red Jacket shaft, having a combined capacity of 8,000 horse power; the South Hecla engines of 5,000 horse power, and the grand array of other machinery, including electrical and hydraulic, makes the visitor wonder if so much grand mechanism is necessary. The surface workings cover an area of two and one-half miles, which is completely dotted with imposing structures, behind whose four walls grind day and night the ponderous machinery, and above which tower the huge smoke stacks, built of solid masonry, some of them lifting their hoods 255 feet into space.

State Maps and Register.

The State Mining Bureau has in present process of preparation maps of several of the mining counties, designed to show the location of the various mines and mineral deposits therein to accompany registers of the same designating the names character, etc., the first supplementing the other. About seventeen are now being compiled, the intention being to ultimately so district the entire State. The registers are prepared in tabulated form. That of Nevada Co. is about complete and gives a fair idea of the scope and character of the work. There are 357 quartz drift and hydraulic mines enumerated and described.

The list begins with the "Ajax, Grass Valley, Sections 2-11, Township 15, Range 18, Map No. 148. Patented, 2200 feet elevation, 1 vein 12 inches wide, strike north and south, dip west, character of ore gold quartz, with galena and sulphide, hanging wall granodiorite, foot wall granodiorite, etc."

Descriptions are full and exact, as No. 3 on the list:

"Allison Ranch, Grass Valley, Section 2, Township 15, Range 8, Map No. 146, Patent-

ed, 2140 feet elevation, 1 vein, width 6 feet 3 inches, strike north and south, dip 41° west, character of ore gold quartz with galena and sulphurets, hanging wall granodiorite, foot wall granodiorite, shaft incline 800, 730, tunnel drifts 5000 feet, greatest depth below outcrop 400 feet, mill power water, number of men employed 54, owners' name Allison Ranch Con. Mg. Co., residence San Francisco, superintendent's name Chas. E. Uren, residence Grass Valley."

SOME REMARKS ON THE CYANIDE PROCESS.*

Mr. Chairman and Members of the Mining Congress:

When your Honorable Committee invited me to read a paper on the Cyanide Process, I at first declined, knowing that there would be present amongst the members of this Congress gentlemen able to read a much more satisfactory paper on Cyaniding than I am in position to do. Considering that the last three years I have not been actively engaged in a Cyanide Plant, I feared that owing to this lack of practical experience, I could not communicate to you the latest improvements made on this process. However, upon a second request from your Honorable Committee to read a paper I consented, not with the intention of taking up your valuable time and attention by reading a long paper on the theory and history of the Cyanide Process, which are only too well known to most of you, but to place before this meeting a few facts, particularly from my own experience, which may perhaps with some of you be a valuable contribution and therefore add to the further development of the Cyanide Process in this country.

I do not need to state that for every ore so to say a special process must be worked out, based on a scientific investigation of the material to be treated.

The first question to present itself is: "Which Gold Ores can be successfully treated by the Cyanide Process? So-called coarse gold is not acted upon by Cyanide, or at least only so very slowly that it is not practical to apply the Cyanide process to ores which contain the gold in coarse condition. Experiments and experience gained have shown that the precious metal can be successfully extracted by means of Cyanide from low grade ores, in which the gold occurs in a very finely divided free or metallic state, and I believe I am safe to state that in nearly all gold-bearing ores the gold exists in a very free and not in a combined state. By this, however, I do not want to say that every low grade ore in which the gold occurs in a very finely divided state can be treated by Cyanide with success, but with very few exceptions ores of this nature can be treated. The selective action of a dilute Cyanide solution on gold ores, in preference to the sulphides of base metals with which they may be associated, is so wonderful that, from a chemical view, we may say that it is possible to extract the gold from all low grade ores by means of Cyanide, with the exception of ores containing Copper, Zinc and Antimony combinations. In these cases the treatment becomes difficult, if not impossible. It is rather unfortunate that Cyanide has this selective action, more or less, on ores containing the above mentioned metals. If this was not the case, we could say that this excellent process

* A paper read before the International Mining Congress, at Salt Lake City, Utah, by Louis Fade, chief chemist and director of the Roessler and Hasslacher Chemical Co., of New York, Cyanide Works, Perth Amboy, N. J.

with which the names of Messrs. McArthur and Forrest are so closely connected, and to which gentlemen the whole Mining Industry of the world is indebted for having first introduced this process, could, from a chemical standpoint, be applied successfully to all classes of low grade ores.

In many cases, however, in which the Cyanide process proved to be a so-called failure, this failure was by no means due to the chemical action of the Cyanide on the ores, but more to the preliminary treatment of the ore. Before beginning with experiments in order to prove whether an ore could be successfully treated by Cyanide, it is absolutely necessary to become thoroughly acquainted with the nature of the ore, as to its chemical qualities as well as to its general structure. In every case a quantitative chemical analysis of the ore should be made, in order to find out if the ore is an oxidize, (so called free-milling ore) or if it belongs to the class of pyrites. The percentage of other metals, and in what combination they are present, should be known. Further, it is of the greatest importance to know the amounts of Silica, Alumina, Magnesia, Lime, etc.

According to the result of this analysis, it is for the Metallurgist to decide whether it is advisable to subject the ore to a number of practical experiments, or whether the ore is unfit to be treated by cyanide at all. If, in the Metallurgist's opinion it is worth while to make further experiments in order to become better acquainted with the nature of the ore, the first, and in my opinion most important question to decide is, which is the most practical way for crushing the ore, that is to say, what crushing apparatus or machinery is the most favorable use? To what size should the ore be best reduced to for leaching purposes?

This question of dry or wet crushing has to be ventilated. The answer to this depends altogether on the nature of the ore. On the one hand dry crushing is the proper way and on the other hand it is detrimental and wet crushing preferable.

On first thought one is inclined to believe that the finer the ore is crushed the better is it for leaching purposes; but this is very often a wrong conclusion. It may be all right for very hard, silicious ore, but not for an ore containing for instance Alumina and Magnesia, which are apt to form slimes when coming in contact with the Cyanide solution and these slimes render the ore impenetrable to any solution, and therefore make good extraction impossible.

(TO BE CONTINUED.)

The Installation of a Notable Water-Power Plant.

The Pelton Water Wheel Company of San Francisco, have under construction a power plant for the British Columbia Railway Co., the most notable installation of the kind in the Northwest. The power station is located at Gold Stream, some 12 miles from Victoria, and the water supply is furnished from the Esquimalt Water Works system.

The plant consists of two 38" D. N. Pelton wheels, 600 h. p. each, running at 600 revs. under 500 ft. head. The wheels are direct connected to Canadian General Electric generators by insulated couplings. The power thus generated is to be transmitted to Victoria at a pressure of 10,000 volts and then used for running the railway system of that city, lighting and general power purposes.

▷ MINING LAW. ▷

All questions and disputes concerning mining law, if addressed to the JOURNAL, will be answered under this heading by F. M. JEFFERY, mining attorney of Los Angeles, Cal. The latest important court decisions on mining cases will also be given.

Important Decisions.

An important decision was rendered during the week from the courts in Denver in the case of the Matao Gold Mining Company vs. the Chicago and C. C. Tunnel Company and the Mutual Benefit Leasing Company, all of Cripple Creek, Colo. The case has been under advisement for some days.

The plaintiff asked for an injunction to prevent the lessees from mining and shipping any ore from the tunnel as the ore was being taken from a vein which had its apex in the Gold Pass No. 1 claim belonging to the Matao Company. It was alleged that ore to the value of \$110,000 had been taken from lessees operating in the tunnel.

The court granted the injunction asked and barred the lessees or any interested directly or indirectly in the tunnel company from working in the property. The plaintiffs, however, were given permission to enter the tunnel and survey the territory.

In an exhaustive opinion, Judge Campbell, of San Bernardino, California, has decided that the California Act, of March 27, 1897, prescribing the manner in which notices and locations are to be recorded, is constitutional; by this decision, all fees for recording will go into the county treasury and not become a perquisite of the office.

Questions and Answers.

(Q.) The president of a mining company gave the note of the company for \$500, signed by himself as president of the corporation, without consulting the board of directors. Will this bind the corporation—the note was given in the ordinary course of business?

(A.) Your question gives so few details that it is hard to answer. If you mean that the name of the company was not signed to the note, but the name of the president alone, and that he added to his signature—president of the mining company, I will say that the corporation is not bound, as it is necessary to bind the company that the name of the company should be signed to the instrument. The courts of the different states have held diametrically opposite opinions of the powers of the president of a corporation. If the corporation received full consideration for the note, and it was signed for the company by some authorized agent, very slight acts on the part of the corporation will be held as a ratification of his act, and the corporation will be bound.

(Q.) Two miners are now occupying one mining claim, but neither one has taken any steps to comply with the law further than to work on the claim; one has a shaft down 20 feet, and the other is working in a tunnel. Who has the best right to the claim?

(A.) Both are trespassers on the public domain, and would have no right as against one who would at this time enter upon the land and comply with the law. As between themselves, both having a possessory title, the one who commenced work and took possession first will have the better title.

(Q.) Is it necessary to live on a mining claim, or to be in actual possession of it to hold it?

(A.) No: You are probably thinking of agricultural land. A constructive possession of a mining claim is sufficient.

(Q.) Are the stockholders of a mining company liable for the debts of the company?

(A.) Most states have statutes making stockholders liable for a greater or less

amount. Some states, among which is Colorado, have no personal liability of stockholders whatever; but if a Colorado corporation comes into this state to do business, where we have a personal stockholders' liability, the stockholders are liable for debts contracted in this state.

(Q.) Three prospectors have for a year past been engaged in the business of working a claim, all having an interest in the claim. One of the prospectors, without the knowledge of the others, or without obtaining their consent, contracted with another person to sink a shaft 50 feet deeper on the claim. Will this contract by one bind and hold good against the other prospectors who knew nothing about it, so that the claim can be taken by the party who did the work?

(A.) This is a mining co-partnership, and each member of a mining co-partnership is the agent for all the others, he can therefore bind the partnership. The creditor of the partnership can either put a lien on the property or sue and attach, in either case, he can take the property for the debt.

PERSONAL NEWS ITEMS

J. E. McIVER, of Poway, San Diego county, Calif., was a caller at the JOURNAL office last week. Mr. McIver has located a tin mine on his place, near Poway, and will develop it when he obtains the necessary wherewithal.

A. J. KING arrived at El Paso, Texas, last month from his mines in the Sierra Madre, Sonora, Mex.

DR. F. R. CARPENTER, of Deadwood, South Dakota, is expected home from the East during the week.

J. BIGLER, of San Bernardino, has gone east to procure a cyanide plant, to run in connection with the stamp mill at Victor.

C. B. FLYNN, the northern Mexico mining man, left Monterey, Neuvo Leon, Mexico, last month for England, on business connected with his mining properties.

R. T. MCINTIRE, of Council Bluffs, Iowa, one of the stockholders in the Big Four Mining Company, was visiting in the Black Hills during the week.

MESSRS. A. R. MEYER, president, C. E. FINNEY, manager, commercial department, and L. P. FEUSTMAN, manager, Mexican department, of the Kansas City Consolidated Smelting and Refining Company, made a tour of Mexico last month. They were accompanied by H. R. SIMPSON, manager of the El Paso smelter and W. B. CLARKE of Kansas City.

H. B. VERCOE, M. E. M. I. M. M., general manager and shareholder of the Riverside Gold Mining Company, (Limited); Perris, Riverside County, Cal., and part owner of the Copper King, Letcher, Fresno County, Cal., will sail for London, England, on the 23rd, and expects to be absent three months, leaving his son, H. Grafton Vercoe, in full charge of the Copper King mine, and H. E. Pedley, M. E. and C. E., in charge of the Riverside gold mines.

J. E. SURMAN & CO., manufacturers of a new mortar, that is a crusher and pulverizer combined, have removed from 103 E. 14th st. to 74 Cortlandt st., New York, where they are prepared to fill all orders.

A company, headed by F. HORTON, of Cleburne, Texas, will develop placer properties near Pihuamo, Jalisco, Mexico, operating extensively with hydraulic machinery.

The attention of the manufacturers of Dry Concentrators or Washers is called to the fact that we have an inquiry for such machines. The address of the party requiring them can be had at this office.

H. GRETTON VERCOE returned to the Copper King mine, at Letcher, Fresno county, Calif., last week, after spending three months at the stamp mill of the Riverside Gold mines at Perris, Riverside county, Calif.

CARL KOELLE, superintendent of the Consolidated Kansas City Smelting and Refining Company's plant at Argentine, Kansas, left for Europe last month, to study European ideas and methods of smelting ores.

MCMANARA & CO. have recently opened an office, at 129 South Broadway, Los Angeles, Calif., for the sale of mines and minerals, assaying, etc. Mr. McNamara has had a great amount of practical experience on the Pacific Coast, which enables him to be of value to those wanting to know anything about mines or mining.

THE MARKETS.

NEW YORK, July 7th, 1898

The following are the Silver, Copper and Lead quotations for the last two weeks:

	SILVER	COPPER	LEAD
June 23	68½	11 75	3 92½
" 24	69½	11 75	3 92½
" 25	69½	11 75	3 92½
" 27	69½	11 75	3 92½
" 28	69½	11 75	3 92½
" 29	69½	11 62½	3 92½
" 30	69½	11 62½	3 92½
July 1	68½	11 62½	3 92½
" 2	68½	11 62½	3 92½
" 4	—	—	—
" 5	69½	11 75	3 92½
" 6	69½	11 75	3 92½
" 7	68½	11 72	3 92½

The market has lapsed into a quiescent state. Orders are moderate, and the disposition is to buy at current rates only as necessities demand.

The United States Assay Office in New York reports the total receipts of silver at 106,000 oz. for the two weeks ending July 9th.

COPPER.

The demand has continued rather poor and some of the producers evidently became tired of waiting, with the result that rather lower prices have again been accepted for all descriptions of copper. While some of the larger Lake companies are still holding out for 11.75c.

For electrolytic copper we have to reduce to 11.37½@11.50c. for cakes, wire bars or ingots, and 11.15@11.25c. for cathodes.

LEAD

A very active business has been done at gradually rising prices. Very little

lead could be obtainable for either prompt or future shipment, and under the circumstances the market closes at its best with a very strong tendency at 3.97½@4c. New York. In the West also a large business was done, and sales are reported in St. Louis at 3.87½@3.90c.

SPELTER

The good consumptive demand continues and the market is rather firm at 4.50@4.55c. St. Louis, and 4.75@4.80c. N. Y. Spot spelter is rather scarce, and refiners have great difficulty at present in meeting their obligations.

ANTIMONY.

Antimony continues strong, and we quote Cookson's 9¾c.; Hallett's, U. S. Star and Japanese, 9½c.

NICKEL.

Business still continues on unchanged lines and no alteration in prices can be reported. We quote for New York ton lots 33½c. and 36c per lb and for smaller orders 35½c. and 38c.

TIN

Prices in New York are, if anything, just slightly below the price at which tin can be laid down on this side. We have to quote for spot 15.55@15.75.

PLATINUM.

Prices are now quoted at \$15 and \$16 per oz., New York. The London quotations are 58@60 s per oz. Supplies are not large and prices are firm. For chemical ware, best hammered metal, Messrs. Eimer & Amend of New York furnish the following quotations: In lots of 250 grams or more, 56c. per gram; in lots of 100 grams or more, 57c. per gram; less than 100 grams, 58c. per gram; unman-

ufactured platinum will be supplied in same quantities at 2c. less per gram.

POTASSIUM CYANIDE.

Purified, 98@99 per cent., in cases of 12 lb. at 32c. per lb. in 5, 10, 25 and 50 lb tins at an advance.

QUICKSILVER.

The New York quotation are at \$43.00 per flask.

The London price is £7. 12s. 6d. per flask

POWDER.

The market at San Francisco is fine with the current quotations.

The quotations are as follows:

For Hercules No. 1, from 11¾c. to 17½c., according to strength and quantity. No. 2, from 9c. to 11c., according to strength and quantity.

COKE.

The coke market has been quite dull the past week, and entirely without features of interest.

IN CAR LOTS, ST. LOUIS.

Connellsburg flky coke 72-hr. fry....\$4.85
New River....\$4.00 Pocahontas....3.90
Crushed.....4.85

Gas works coke, lump, per bushel. 10

BORAX.

The San Francisco market in Borax is firm with a good demand.

The market is quoted as follows:

Refined, in carload lots, in barrels.....7½
Refined, in carload lots in sacks.....7
Powdered, in car lots.....7½
Concentrated, in car lots.....6½

THE MINOR METALS.

Quotations are given below for New York delivery:

Aluminum:
No. 1, 98 per cent. ingots, per lb.....33@40c
No. 2, 99 " " " " " 31@34c
Rolled sheets, per lb.....35c. up

Aluminum.—Nickel, per lb.....23@29c
Bismuth, per lb.....\$1.00@1.20
Phosphorus, per lb.....40@50c
Tungsten, per lb.....70c
Ferro-tungsten, 60 per cent.....60c

Variations in price depend chiefly on the size of the order.

CHEMICALS.

There has been no material change in demand for heavy goods.

Quotations generally are as follows:

CAUSTIC SODA.

Quotations for Caustic soda domestic high test are \$1.40 @ 1.50 per hundred lbs.

ALKALI.

Domestic, 58 percent, 50c. @ 55c., foreign 55c. @ 60c. from dock as to style of package.

CARBONATED SODA ASH.

58 per cent., 90c and 95c. per 100 lbs. basis 48 per cent.

BICARBONATE OF SODA.

English, \$2.12½ @ \$2.25 per 100 lb. American, bulk \$1.25 and \$1.50 per 100 lbs. according to brand.

SAL-SODA.

For domestic, 50c. per 100 lb., less usual discounts; English, 62½c. and 65c. Concentrated sal-soda, \$1.60 @ \$1.65 per 100 lbs.

CHLORATE OF POTASH.

Chlorate of potash is quoted at \$8.25 and \$8.37½ per 100 lbs.

CHLORIDE OF LIME.

English prime brands \$1.60@\$1.65; Ordinary, \$1.70@\$1.80; Continental, \$1.40@\$1.50; and French \$1.35 per 100 lbs.

Acids.

The market for the following acids lacks interest; has practically been at a standstill, through prices are pretty steady.

LEHIGH UNIVERSITY

South Bethlehem, Pa.

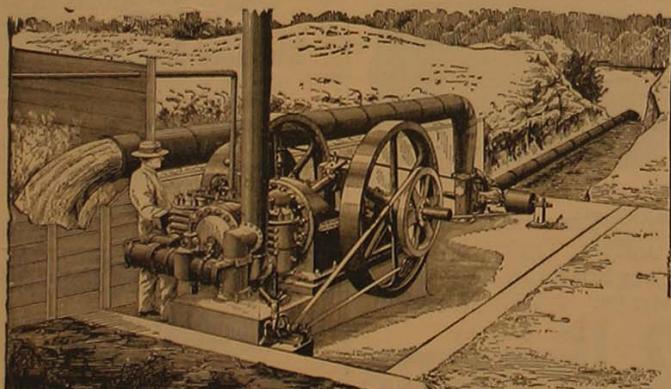
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The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works at the Packer Ranch, Colusa Co., 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue, HERCULES GAS ENGINE WORKS, 916 Bay St., San Francisco.

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"Phone Brown 313"

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SMITH & IRVING,
(FORMERLY, W. T. SMITH & CO.)

Gold Refiners and Assayers.

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Our Mr. Smith owned and operated Smelting, Refining and Chemical works in Providence, R. I., for over 20 years.

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* ADVERTISE IN THE JOURNAL *

Prices are per 100 lbs. in New York and vicinity in lots of 25 carboys or over. Quotations are as follows: Acetic acid, commercial No. 8 \$1.40 @ \$1.55; redistilled, 28 per cent., \$2.00 @ \$2.15; Muriatic acid, 18 per cent., 1.10 @ \$1.75; 20° \$1.20 @ \$1.87½; 22°, \$1.35 @ \$2.25, according to make and quantity. Nitric acid, 38°, \$3.50 @ \$4.75; 38°, \$3.75 @ \$4.62½; 40° \$4.00 @ \$4.87½; 42°, \$4.62½ @ \$5.25. Oxalic acid, \$6.50 @ \$7.00. Mixed acids, according to mixture. Sulfuric acid, 66 per cent., \$1.10 @ \$1.75. Chamber acid, 50° \$11.50 @ \$12 per ton at factory. Blue Vitriol, \$3.50 @ \$3.62½, according to grade and order.

BRIMSTONE.

Demand continues moderate. No arrivals are noted, and prices are: Futures lower and the quotations for cargoes to arrive is \$22.50 per ton and for best unmixed seconds with \$20.50 named for thirds.

MURIATE OF POTASH.

We quote per 100 lbs. on basis of 80 per cent., as follows: New York and Boston, \$1.78 for 80@85 per cent., and \$1.81 for 95 per cent.; Norfolk and Philadelphia, \$1.76½ for 80@85 per cent., and \$1.79½ for 95 per cent.; Charleston, Savannah, Wilmington, N. C. and New Orleans, \$1.78½ for 80@85 per cent., and \$1.81½ for 95 per cent. All for lots of 50 tons and upward.

KAINT.

Invoice weights as taken at port of shipment per ton of 2,240 lbs. testing 12.4 per cent. actual potash, equivalent to 23 per cent. sulphate of potash, \$8.55 @ \$8.80 for New York and Boston; \$8.90 @ \$9.15 for Norfolk, and Philadelphia; and \$9.05 @ \$9.30 for Charleston. Sa-

vannah, Wilmington, N. C., and New Orleans.

NITRATE OF SODA.

Prices continue a little uncertain, with rather a downward tendency. The quotations are unchanged at \$1.60 @ \$1.70 per 100 lbs. for spot, \$1.50 for July arrivals, \$1.60 for August, \$1.55 @ \$1.57½ for September, and \$1.52½ @ \$1.55 for October-December, inclusive.

FINANCIAL NOTES.

The statement of the United States Treasury, on Thursday, July 7th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	July 7	Changes.
Gold.....	\$169,650,213	I. \$3,207,075
Silver.....	10,596,352	D. 307,748
Legal Tenders.....	35,620,307	I. 2,255,661
Treasury Notes, etc.....	2,589,664	I. 282,432
Totals.....	\$219,828,659	I. \$5,437,420

Treasury deposits with national banks amounted to \$46,218,286, a decrease of \$124,501 during this week.

Average Monthly Prices of Silver.

In New York per ounce Troy, from January 1st, 1898, and for the years 1897 and 1861.

Month	1898	1897	1861
	Cents.	Cents.	Cents.
January.....	56.77	64.79	67.13
February.....	56.07	64.67	67.67
March.....	54.90	63.08	68.40
April.....	56.02	61.85	67.92
May.....	56.98	60.42	67.78
June.....	58.61	60.10	68.69
July.....	59.61	68.75	
August.....	54.19	67.84	
September.....	55.24	65.68	
October.....	57.57	66.05	
November.....	57.91	64.99	
December.....	58.01	65.21	
Year.....	59.79	67.75	

Gold and Silver Exports and Imports.

At all United States ports, May, 1898, and years from January 1st, 1898, and 1897:

	Coin and Bullion Exp.	In Ores Imp.	Exp.	Imp.
Gold—	\$ 109,157	\$13,119,383	\$ 109,517	
1898	5,673,031	87,059,977	72,441	2,493,204
1897	17,377,326	3,666,605	93,068	1,788,993

Silver—

	May.....	June.....	July.....	Aug.....	Sept.....	Oct.....	Nov.....	Dec.....	Total.....
1898	4,184,432	4,88,568	1,12,699	1,080,881					
1897	20,236,278	2,402,361	8,047,223						
	22,808,937	3,465,967	259,159	8,559,708					

MINING STOCK QUOTATIONS

BOSTON

Attna Con.	do, rights.	55
Allouez	3 38 Gold Coin	1 00
Acadona	Humboldt	4 75
Arnold	16 88 Illinois Steel	60 00
Ash Bed	3 88 Lake Sup Iron	—
Atlantic	28 00 Merced	—
Baltic	17 88 Native	75
Bonanza	do, Idria Mg	—
Boston & C.C.	Old Dominion	28 00
Benton & Mont'g	do	11 1/4
Buile & Boston	24 75 Parrott	22 00
Calumet & Hecla	57 00 Pioneer	5 75
Catalpa	Quincy	118 1/2
Centennial	16 50 San Ysabel	—
Dominion Coal	24 00 Tamarack	165 00
Dominion Pref.	168 3/4 Wolverine	2 00
Franklin	14 75 Wolverine	23 00

NEW YORK

Alamo	3 3/4 Homestake	28 50
Alice	40 Iron Silver	—
Argentina	45 Mexican	30
Best & Belcher	60 Mollie Gibson	19
Brunswick	65 Ontario	4 50
Bulwer	Ophir	—
Crown Point	65 Pharmacist	10
Con. Cal. & Va.	Plymouth	—
Cripple Creek Con	68 1/2 Quicksilver	3 00
Deadwood	Quicksilver pid.	11 00
Favorite	11 25 Sierra Nevada	—
Fortuna	04 Standard	1 60
Golden Fleece	45 Union Con	—
Gould & Curry	45 Yellow Jacket	—
Hale & Norco s.	—	—

COLORADO SPRINGS STOCKS

Alamo	62 Jack Pot	3 1/2
Acadona	52 Lexington	—
Argentum Juanti	26 Lillie	90
Rob Lee	Magnet R.	003 1/2
Creede & C. C.	63 Marion	—
C. C. Consolidated	09 Matae	15
Des Moines	Mollie Gibson	23 1/2
Elkton Con	93 Moon-A-c'r.	74 1/2
El Paso	07 Mount Rosa	12 1/2
Fanny R.	16 New Haven	01 1/2
Favorite	— Pharmacist	05
Fludley	63 Pilgrim C.	—
Franklin	Portland	99 1/2
Golden Crater	Pr. Albert	01 1/2

Golden Fleece	30 Specimen	—
Gold & Globe	— Theresa	—
Hayden	1005 Trachyte	00 1/2
Ing. Con.	083 Union Gold	—
Isabella	29 1/2 Work	02 1/2

LOS ANGELES, CAL.

Amargosa	05 Lucky Star	—
Brown Lake	07 1/2 Magellan	8 00
East Amargosa	Mohawk Action	50
Empire Copper	25 Old Dominion	03
Gold Bug	1 00 Pacific Con	1 25
Grand Central	02 Rand Mt.	1 25
Iron Mt.	02 Sun Dance	40
Laurel Mt.	02 1/2 Val Verde	1 50
Little Butte	15 Wedge	09 1/2

SAN FRANCISCO

Alpha	— Eschequer	—
Alta Con.	10 Gould & Curry	21
Andes	09 Hale & Norcross	1 65
Belcher	23 Justice	55
Best & Belcher	27 Mexican	21
Bodie	— Ophir	80
Bullion	10 Overman	—
Challenge	21 Potosi	21
Chollar	15 Savage	10
Confidence	85 Sierra Nevada	67
Con. Cal. & Va.	45 Union Con	11
Con New York	Utah	07
Crown Point	13 Yellow Jacket	03

SALT LAKE CITY

Alice	70 Lucky Bill	—
Ajax	31 Malvern	—
Alliance	Mammoth	1 85
Anchor	10 Maxfield	—
Buckeye	02 Mercer	7 15
Bull, Beck	5 90 Morgan	—
Cape Eureka	31 00 Northern Light	91
Chloride Point	85 Omaha	30
Dalton	09 1/2 Ontario	3 25
Daly	70 Overland	—
Daly West	3 50 Richmon Ana.	—
Dalton & Lark	10 condona	68 1/2
Dexter	1 25 Rover	—
Eagle	04 Sacramento	62 1/2
Eureka Hill	— Silver King	20 00
Four Aces	08 1/2 Sioux Con.	—
Galena	54 Sunshine	08 1/2
Gemini	— Sunshine	24
Geyser-Marion	76 Swanses	2 42 1/2
Grand Central	6 97 1/2 So Swanses	1 18
Homestake	01 1/2 Utah	47
Horn Silver	1 37 1/2 Utah Con	—
Little Pittsburg	02 1/2	—

ROSSLAND, BRITISH COLUMBIA.

Alberta	05 Jonie Mac	12 1/2
B.C. Gold King	07 Josie	38
Beaver	10 Jumbo	75
Big Three	10 Knight Templar	05
Bluebird	07 Kootenay-London	—
Bruce	10 Le Rot	8 00
Butte	01 1/2 Lilly May	18
Caledonia Con	05 1/2 Mabel	15
California	15 Mayflower	10
Camp Bird	05 Monita	19 1/2
Celtic Queen	05 Monte Christo	—
Colony Star	— Morning Star	09
Coloma	24 Mogwump	03
Commander	18 Nest Egg	05
Deer Park	12 Northern Belle	09
Della Colla	02 Novelty	05
Delaware	12 O. K.	10
Eastern Star	20 Palo Alto	—
Enterprise	20 Phoenix	13 1/2
Eric	03 1/2 Poorman	15
Eureka Con	05 1/2 R. Lee	15
Evening Star	08 1/2 Red Eagle	—
Georgia	10 1/2 Red Mount, View	—
Gertude	10 1/2 Red Point	—
Golden Trip	15 Rossid H'mest'ke	05
Gold Horn	03 1/2 Rossland, Red Mt.	20
Grand Price	03 1/2 St. Elmo	06
Great Western	08 Star Palace	00
Hattie Brown	04 Silver Bell	01
Hele	04 Silverine	06
High Ore	04 1/2 So Cross & W. Con	12
Imperial	10 Virginia	12
Iron Horse	20 War Eagle Con	11
Iron Mask	38 West Le Roi	21
I. X. L.	10 White Bear	11

DENVER STOCK REPORT.

Aetna	00 1/2 Keystone	04
Anaconda	51 Little	80
Arcadia	00 1/2 Moon A	78
Argentum Junta	28 Mt. Rosa	12 1/2
Banier	07 Old Gold	1 1/2
Bob Lee	09 1/2 Peoples	01 1/2
C. C. Con.	08 1/2 Pilgrim C.	00 2 1/2
Elkton	90 1/2 Pine Creek	00 2 1/2
El Paso G	06 1/2 Portland	—
Enterprise	07 1/2 Prince Albert	01 1/2
Garfield Group	06 Republic	02 1/2
Gro, Washington	00 1/2 Sacramento	02 1/2
Golden Eagle	34 Specimen	03
Gold Coin	98 Tamarack	00 4 1/2
Gilpin & C.	08 1/2 Union Gold	10 1/2
Gilpin Four	00 1/2 Virginia M.	03 1/2

Iron Clad	02 1/2 Wheel of Fortune	00 2 1/2
Isabella	23 Work	02 1/2
Jack Pot	03 1/2	—

MEXICO

Name of Company	State	Price
Alianza	Hidalgo.	5
Amistad y Concordia	"	24
Angustias	Guanajuato	710
Arevalo y Anexas.	Hidalgo.	240
Asturiana y Anexas	Zacatecas	250
Barradon y Cabras	Durango	300
Baston de Medina	Hidalgo.	100
Cajon y	Zacatecas.	30
Candelaria de Finos	"	160
Candelaria de Panuco	"	20
Candelaria de Chalch	"	80
Capuzaya	Durango.	120
Carmen	Hidalgo.	350
Castellana y San Ram	Chihuahua	10
Cerro Colorado	Guanajuato	650
Cinco Señores y An	S. Luis Potosi	280
Concepcion y Anexas	Guanajuato	40
El Oro	Guanajuato	1,300
Esparanza y An.	Guanajuato	180
Guadalupe	Michoacan	100
Hidalguilla	Hidalgo.	150
Hidalgo	"	5
Imperial	Michoacan	40
Imperial	Hidalgo.	200
Iron Horse	Maravillas	80
Enchillon	"	150
Palma	Zacatecas.	150
Purisima de los Com	"	5
Real del Monte.	Hidalgo.	900
Refugio y Va	"	8
Restauradora	Durango.	80
Rosario y Anexas	"	50
San Francisco.	Hidalgo.	270
S. Ped. Chalchihuites.	"	100
San Rafael y Anexas	"	925
do, Free Stock	"	400
San Rafael del Oro	Hidalgo.	20
Site, Maria de la Paz	S. Luis Potosi	750
Sirena	Durango.	80
Soledad.	Hidalgo.	180
Surpresa	"	250
Trinidad	Guanajuato	40
El Paso G	Puebla	27
Portland	Hidalgo.	280
Enterprise	Union	15
Prince Albert	"	15
Garfield Group	Zaragoza	15
Gro, Washington	Zaragoza	100
Golden Eagle	Zaragoza	100
Geo, Washington	Zaragoza	100
Golden Eagle	Zaragoza	100
Gold Coin	Zaragoza	100
Gilpin & C.	Zaragoza	100
Gilpin Four	Zaragoza	100

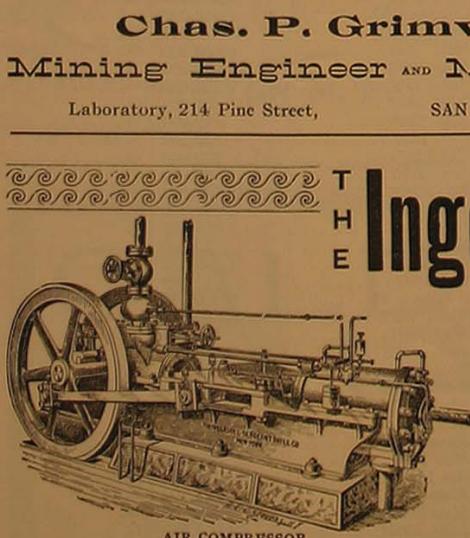
NOTE—The above Mexican stocks are figured on the basis of Mexican silver

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ROCK DRILLING

INCORPORATED MINES PAYING DIVIDENDS.

NAME OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Mineral Produced
Actna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Sept 1897	\$ 110,000	Q.
Ajax	Utah	300,000	3,000,000	10	35½	October, 1897	1,000,000	G, C, S, L
Alaska, Treadwell	Alaska	200,000	5,000,000	25	10	Oct., 1897	3,250,000	G.
Alaska Mexican	Alaska	200,000	1,000,000	5	10	Oct., 1897	297,031	G.
Alice	Montana	400,000	10,000,000	25	03	Oct 1897	1,055,000	G.
Alice	Utah	400,000	10,000,000	25	05	April 1898	1,075,000	S, L, G.
Anaconda	Montana	1,200,000	30,000,000	25	1 25	May 1897	3,750,000	C.
Anchoria Leland	Colorado	600,000	600,000	1	01	Oct 1897	84,000	G.
American Gold	Colorado	300,000	3,000,000	10	02	Aug 1897	273,000	G. S. L
Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1897	740,000	S.
Bald Butte	Montana	250,000	250,000	1	03	Sept 1897	512,500	G, C. S.
Bangkok C-Bell	Colorado	600,000	600,000	1	01	July 1896	107,510	S. L. C.
Big Six	Colorado	500,000	500,000	1	00½	April 1897	5,000	G. S.
Boston & Montana	Montana	150,000	3,750,000	25	3 00	Aug 1897	6,275,000	G. C. S.
Bullion Beck and Champion	Utah	100,000	1,000,000	10	50	Mar 1897	2,485,000	G. S.
Bunker Hill and S.	Idaho	300,000	3,000,000	10	05	Oct 1897	324,000	S. L.
Cariboo	British Col.	8,000	800,000	1	02	May 1897	156,965	G.
C. O. D.	Colorado	50,000	500,000	1	01	March 1896	25,000	G.
Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Oct 1897	50,850,000	G.
Centennial Eureka	Utah	30,000	1,500,000	50	1 00	Mar 1897	2,010,000	S. L.
Central Lead	Missouri	4,000	400,000	100	1 00	Oct 1897	16,000	L.
Charleston	South Car.	10,000	1,000,000	100	1 00	Feb 1897	150,000	.....
Champion	California	34,000	340,000	10	25	Aug 1897	278,200	G.
Chloride Point	Utah	500,000	500,000	1	01	Dec. 1897	5,000	G. S.
Crescent	Utah	24,000	600,000	25	.....	July 1897	280,000	.....
Daly	Utah	150,000	3,000,000	20	.....	Mar 1897	2,925,000	S. L.
Deadwood Terra	Dakota	200,000	5,000,000	25	40	June 1897	1,320,000	G.
De Lamar	Idaho	400,000	2,000,000	5	25	Jan 1897	2,250,100	S. L.
Della S.	Colorado	1,000,000	1,000,000	1	10	Jan 1897	60,000	G.
Doe Run	Missouri	5,000	500,000	100	50	October 1897	.....	L.
Dalton and Lark	Utah	2,500,000	2,500,000	1	00½	August 1896	87,500	S. L.
Elkton Consolidated	Colorado	1,250,000	1,250,000	1	03	Sept 1897	361,960	G. S.
El Paso	Colorado	650,000	650,000	1	01	Ang 1897	5,393	G. S.
Eureka Hill	Utah	10,000	1,000,000	100	.....	1897	1,850,000	.....
Florence	Montana	500,000	2,500,000	5	01	May 1897	132,530	S.
Galena	Utah	100,000	1,000,000	10	05	Jan 1897	71,000	G, S, L
Garfield Grouse	Colorado	1,200,000	1,200,000	1	01	Feb. 1897	24,000	G.
Gemini	Utah	5,000	500,000	100	.....	1897	500,000	.....
Geyser-Marion	Utah	300,000	1,500,000	5	02	May 1898	84,000	G.
Golden Eagle	Colorado	1,000,000	1,000,000	1	01	Sep 1896	10,000	G.
Golden Fleece	Colorado	600,000	600,000	1	01	Feb. 1897	569,179	G. S.
Gold Coin	Colorado	200,000	1,000,000	5	05	Aug 1897	150,000	G. S.
Gold and Globe	Colorado	750,000	750,000	1	3-10	July 1897	51,625	G.
Hecla Consolidated	Montana	30,000	1,500,000	50	50	Feb 1897	2,175,000	S. G. I. C.
Helena & Frisco	Idaho	500,000	2,500,000	5	04	August 1896	475,000	S. L.
Highland	S. Dakota	100,000	10,000,000	100	20	Oct 1897	3,424,918	G.
Holy Terror	S. Dakota	300,000	300,000	1	03	Sept 1897	18,000	G.
Homestake	Dakota	125,000	12,500,000	100	25	Oct 1897	6,431,250	G.
Hope	Montana	100,000	1,000,000	10	10	Nov 1897	732,252	S.
Horn Silver	Utah	400,000	10,000,000	25	05	April 1898	5,120,000	S. L.
Idaho	Brit. Col.	500,000	500,000	1	05	Mar 1887	152,000	.....
Iowa	Colorado	1,000,000	1,000,000	1	00½	Oct 1897	65,000	G.
Iron Mountain	Montana	500,000	5,000,000	10	01	Sept 1897	497,500	S.
Isabella	Colorado	2,250,000	225,000	100	00½	June 1897	270,000	G.
Kearnsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C.
Last Chance	Brit. Col.	500,000	500,000	1	04	Jan 1897	42,000	S. L.
Le Roi	British Col.	500,000	2,500,000	5	10	Oct 1897	625,000	G.
Minnesota	Minnesota	165,000	16,500,000	100	1 50	July 1896	3,240,000	I.
Montana Ore Purchasing	Montana	40,000	1,000,000	25	01	October 1897	640,000	.....
Morning Star	California	2,400	240,000	100	8 00½	Sept. 1897	558,600	G.
Mt. Rosa	Colorado	1,000,000	1,000,000	1	00½	Oct. 1896	30,000	G.
Mercur	Utah	200,000	5,000,000	25	18	May 1898	1,066,000	G.
Mammoth	Utah	400,000	10,000,000	25	05	June 1898	1,250,000	G, S, C, L.
Moon Anchor Gold	Colorado	600,000	600,000	1	02	Nov 1897	63,000	G.
New Elkhorn	Colorado	300,000	1,500,000	5	24	Sep. 1896	72,000	G.
New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Oct. 1897	832,500	S. G.
Napa	California	100,000	700,000	7	20	Oct 1897	870,000	Q.
New Idria Quicksilver	California	100,000	500,000	5	10	Sept 1897	20,000	Q.
Ontario	Utah	150,000	15,000,000	100	75	Dec. 1897	13,542,500	S. L.
Osceola	Michigan	50,000	1,250,000	25	1 00	June 1897	2,172,500	C.
Parrot	Montana	230,000	2,300,000	10	06	June 1897	1,656,122	C.
Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Sept 1897	20,750	.....
Portland	Colorado	3,000,000	3,000,000	1	01½	Oct 1897	1,163,000	G. S.
Princess	Colorado	1,000,000	1,000,000	1	00	Feb 1897	45,000	G.
Quincy	Idaho	100,000	2,500,000	25	4 00	August 1-97	9,470,000	C.
Rambler-Cariboo	Brit. Col.	1,000,000	1,000,000	1	02	April 1897	40,000	.....
Reco	Brit. Col.	1,000,000	1,000,000	1	50½	May 1897	187,500	S. L.
Sacramento	Utah	1,000,000	5,000,000	5	00½	June 1898	35,000	G.
Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Mar 1896	3,275,000	S.
South Swansea	Utah	150,000	150,000	1	05	April 1898	90,000	S. L.
Standard	California	200,000	20,000,000	100	10	Sept 1897	3,757,868	G. S.
St. Joseph	Missouri	250,000	2,500,000	10	15	Oct 1897	24,000	L.
Silver King	Utah	150,000	3,000,000	.20	25	June 1898	1,575,000	S. L. G.
Slocan Star	Brit. Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	.....
Smuggler Union	Colorado	50,000	5,000,000	100	1,00	Oct 1896	150,000	G. S.
Swansea	Utah	100,000	500,000	5	05	June 1898	100,000	S. L.
Tom Boy	Colorado	200,000	2,000,000	10	20	March 1896	410,000	G.
Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1897	4,950,000	C.
Union	Colorado	1,250,000	1,250,000	1	01	June 1897	73,000	S.
Utah	Utah	100,000	1,000,000	20	01	Dec. 1897	177,000	G. S.
Utah Consolidated	Utah	30,000	150,000	5	02	Sept. 1896	3,000	S. L.
Victor	Colorado	200,000	1,000,000	5	10	March 1897	765,000	G.
Western Mine Enterprise	Montana	500,000	500,000	1	10	Mar 1897	12,000	.....
War Eagle	British Col.	500,000	500,000	1	06	October 1898	187,000

S, Silver.

G, Gold.

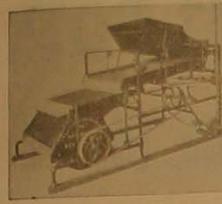
L, Lead.

C, Copper.

Q, Quicksilver.

I, Iron.

B, Borax.

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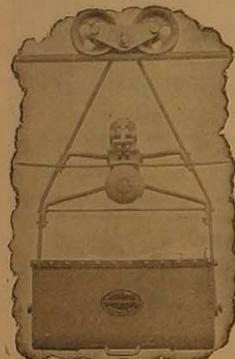
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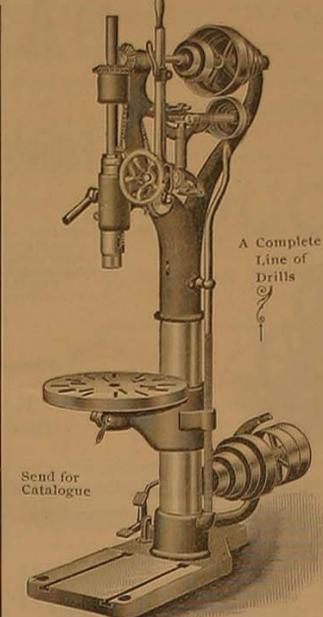
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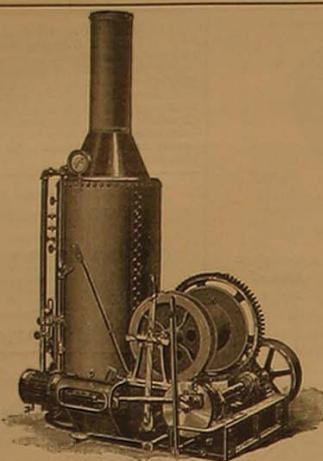


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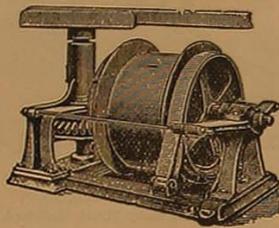
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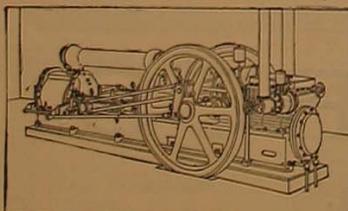
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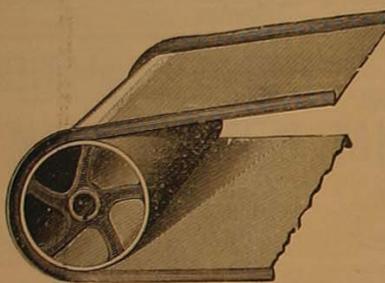
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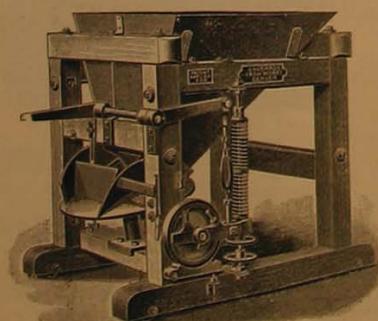
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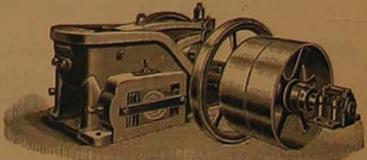
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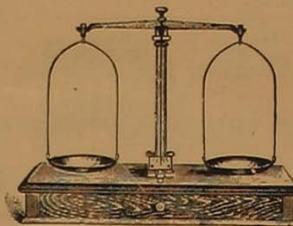


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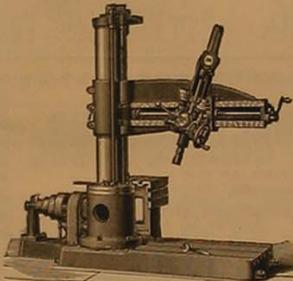
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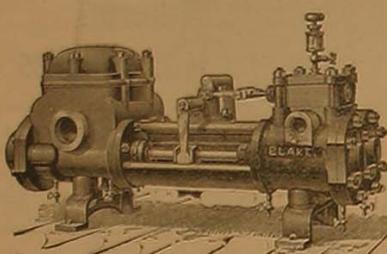
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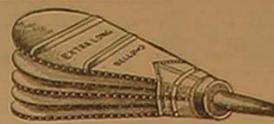
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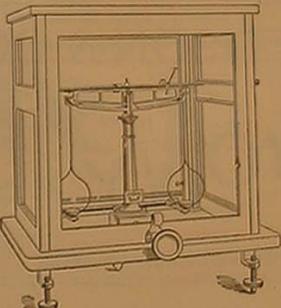
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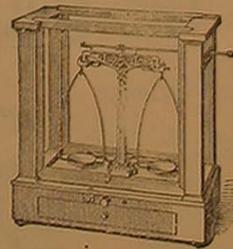
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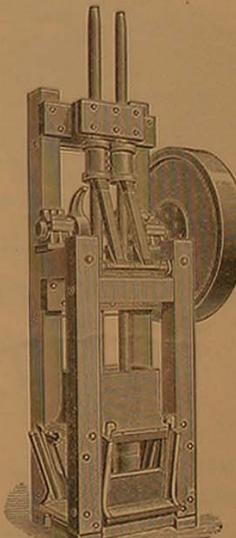
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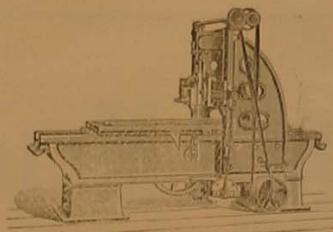
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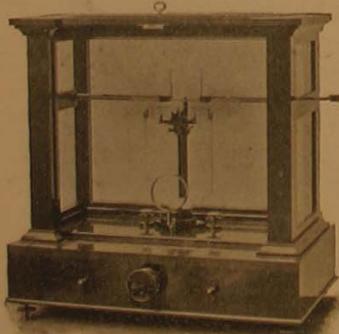
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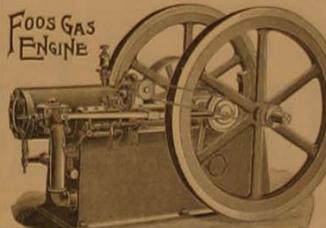
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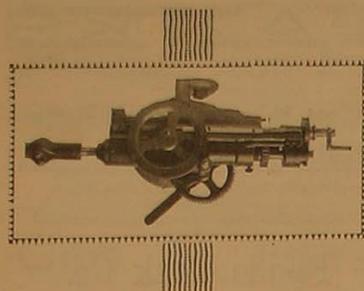
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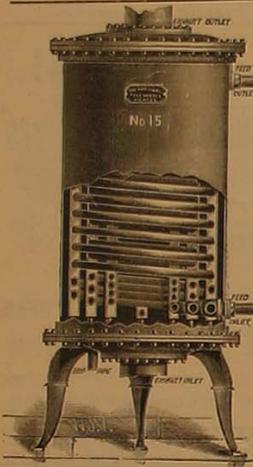
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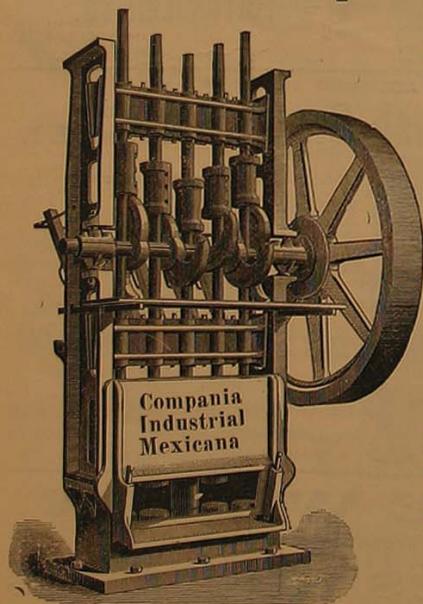
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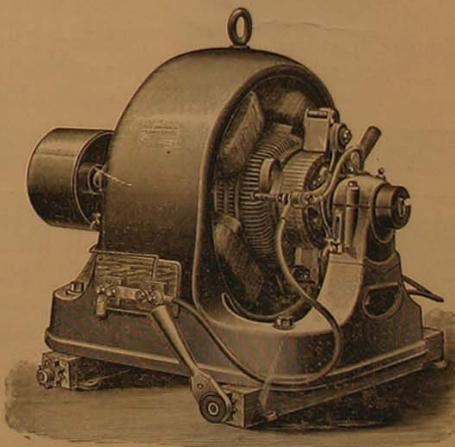
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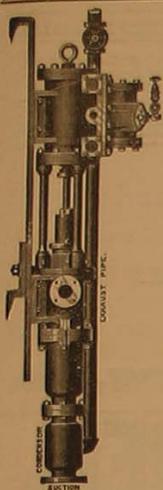
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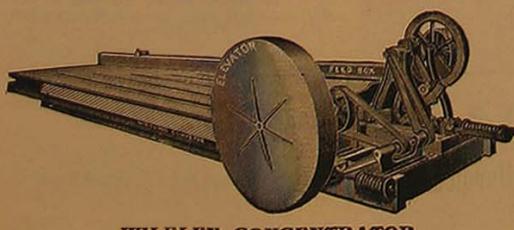
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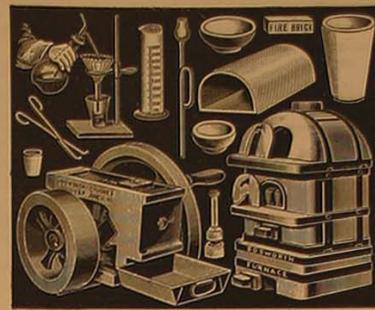


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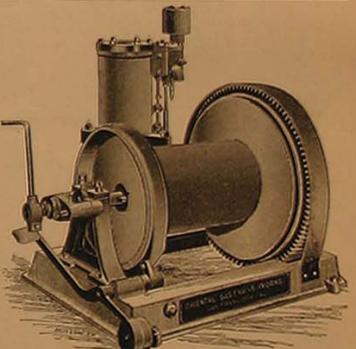
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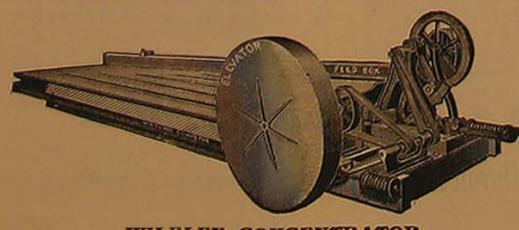


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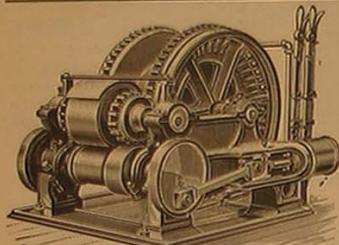
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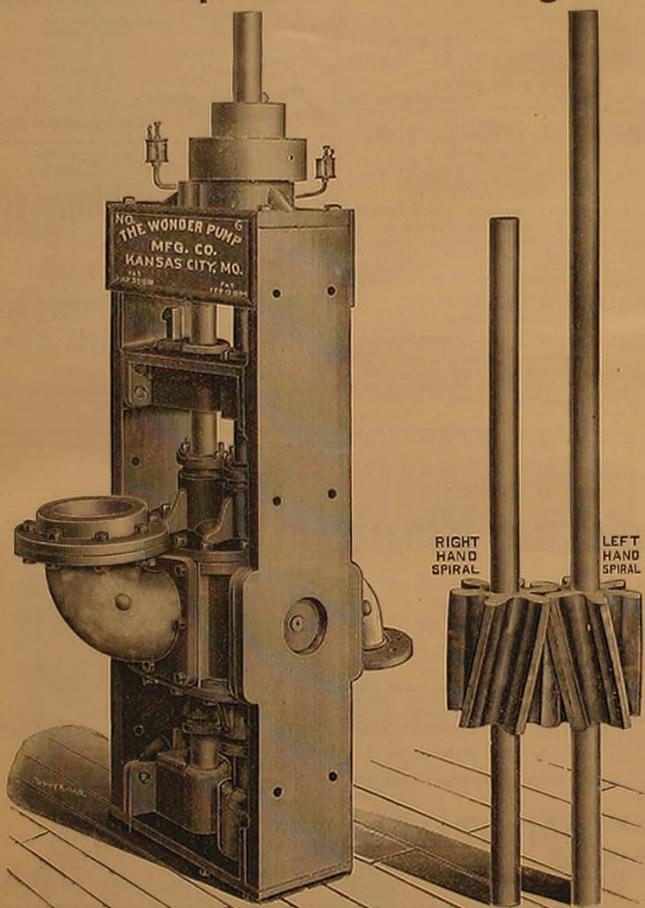
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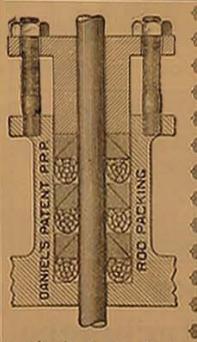
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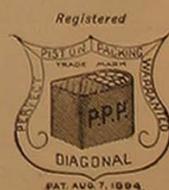
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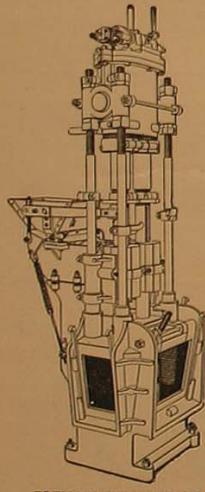
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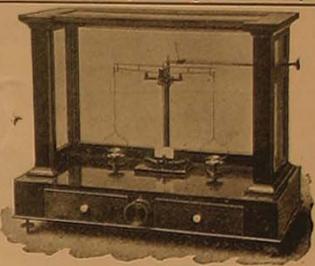
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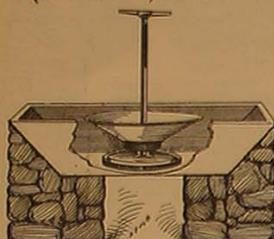
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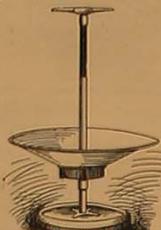
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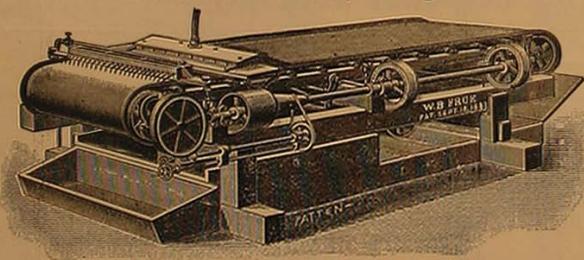
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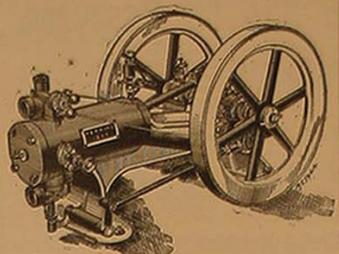
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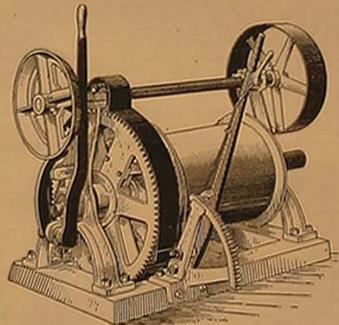
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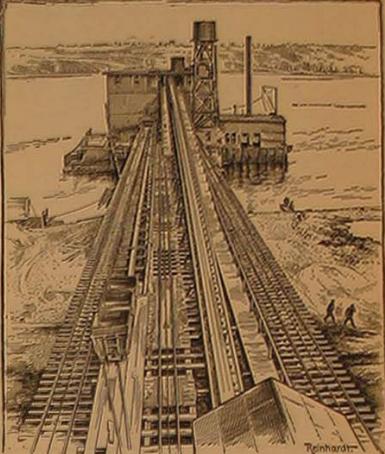
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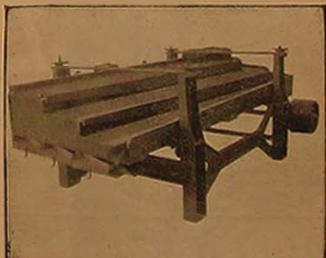
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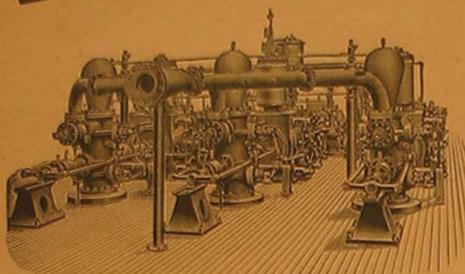
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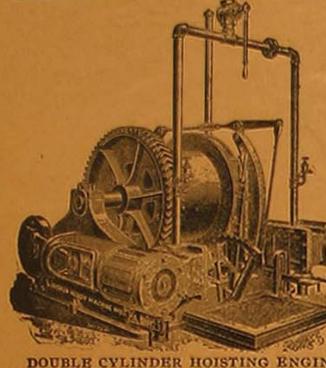


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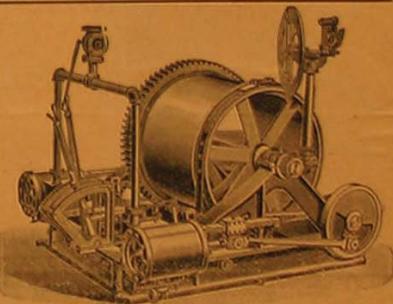
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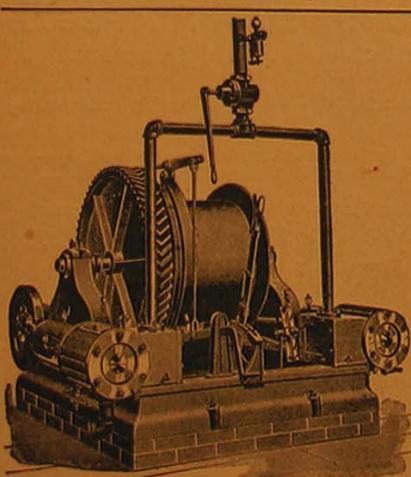
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